USE OF A RELAXATION/GUIDED-IMAGERY TAPE TO IMPROVE THE EXPERIENCE AND OUTCOME OF PREGNANCY IN NULLIPARAS

by

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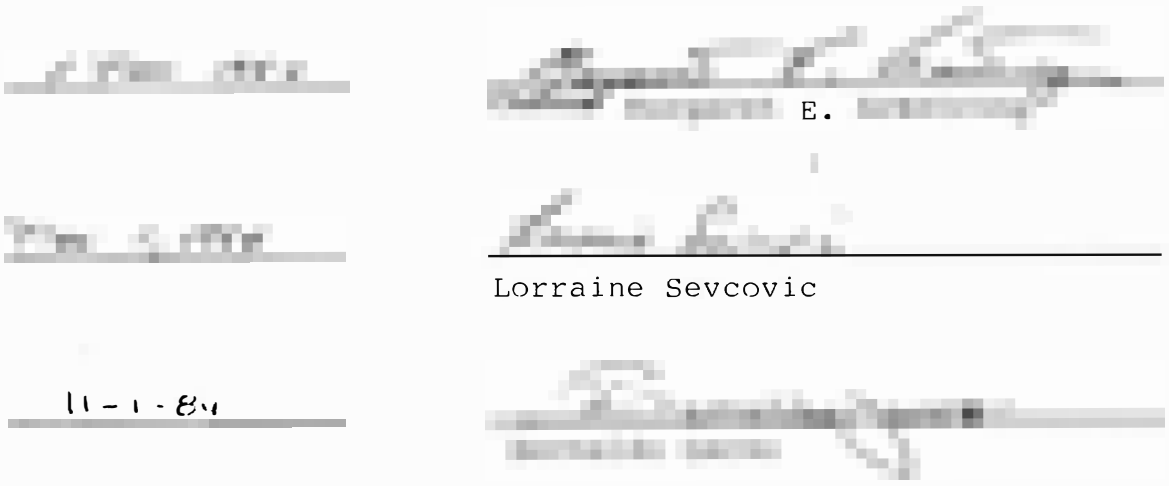

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ABSTRACT

This study was designed to test the effects of a cassette tape employing relaxation and guided imagery on diastolic blood pressure, proteinuria, fetal outcome, anxiety, and locus of control in women experiencing their first pregnancies. It was hypothesized that use of the tape would render diastolic blood pressure, proteinuria, incidence of fetal mortality and small size for dates, anxiety, and locus of control lower and birthweight, gestational age, and 5-minute Apgar scores higher in the experimental group than in the control group. It was also hypothesized that there would be a positive relationship between compliance with use of the tape and change to a more internal locus of control.

A convenience sample of 22 nulliparas between 32 and 36 weeks' gestation was recruited from four sites in the Salt Lake and Utah Valleys and subjects were randomly assigned to either the experimental or the control group. Subjects in the experimental group were asked to use the tape once a day. Subjects in the control group were given no special treatment. Anxiety was measured by the Spielberger State-Trait Anxiety

Inventory and locus of control by the Rotter Internal-External Scale at the first session, and these measures were repeated 4 weeks later. Diastolic blood pressure and proteinuria from the first session to the onset of labor were taken from subjects' clinic records, and fetal-outcome measures were taken from their delivery and/or newborn records.

There were no significant differences between groups. There was, however, a correlation of .707 between compliance and change to a more internal locus of control which was significant at $p = .017$. A similar correlation (.738) was found between compliance and decrease in state anxiety ($p = .012$). Compliance ranged from 25 to 200% with 3 subjects demonstrating full compliance and 4 subjects demonstrating compliance of 50% or less.

The results suggest that failure to detect differences between groups may have been related to poor compliance. The high correlations between compliance and decreases in locus-of-control and state-anxiety scores suggest that further testing is needed and that such testing should consider the issue of compliance.

To my family for their

holistic support

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Each member of the researcher's supervisory committee made a unique contribution to the execution of this study. Dr. Bernaldo Garso's expertise in hypnosis and suggestion made him an invaluable consultant in the design and modification of the intervention. Ms. Lorraine Sevcovic's experience in clinical practice and administration allowed her to offer practical lessons on the nature of informal power and the realities of negotiating access to clinical sites. Ms. Margaret Armstrong's extensive knowledge of the physiological basis for guided imagery and her willingness to share her personal library helped to introduce the researcher to the growing body of literature dealing with physiological applications of guided imagery. As chairman of the committee, she offered timely criticisms of the manuscript coupled with support and encouragement. All committee members sustained the researcher with an inspiring confidence in the power of imagery and suggestion.

The researcher thanks Dr. Julian Rotter for allowing reproduction of his Internal-External scale. Mr. Brent Marshall of WT Studios deserves credit for producing

a quality recording of the intervention. Dr. King Udall provided access to the University's family-practice clinics, the only clinical sites used in the study which were not staffed by nurse-midwives. His flexibility and assistance in facilitating the research as well as his openness to the possibilities of the intervention are deeply appreciated.

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CHAPTER I

INTRODUCTION

Purpose of the Study

The purpose of this study was to determine if the use of a relaxation/guided-imagery cassette tape over a 4 week period would be effective in alleviating or preventing symptoms of pregnancy-induced hypertension, in improving fetal outcome, and in reducing anxiety in pregnant nulliparas. The study also explored whether use of the tape affected locus of control and vice versa.

Background Information

Western medicine has become so committed to technology--particularly the technology of drugs--and so imbued with the concept that healing results from exogenous forces acting on the body, that any other perspective is likely to be dismissed as fanciful. Recently, however, an interest in alternative perspectives on health and illness is being revived.

Technology has been found wanting in the realm of chronic and "incurable" diseases, as well as in the larger realm of "health," which has begun to connote,

not merely absence of disease, but harmonious functioning of the entire organism: biological, psychological, and social. The idea of harmonious functioning, moreover, has expanded to include the possibility of conscious control over both mental and physical, both "voluntary" and "involuntary" processes.

Western man is expanding his world view beyond its cultural limitations and searching for wisdom in the past and in other cultures. One of the benefits of this quest has been the rediscovery of the power of belief and suggestion. Since the last century, many of the ancient healing practices involving suggestion have been resurrected and given "scientific" western names like hypnosis, autogenic training, therapeutic touch, and guided imagery or visualization.

So it happens that the boundaries of medicine today merge more and more with what, only yesterday, would have been called fantasy. And from the uneasy suspicion that there may indeed be "more things in heaven and earth...than are dreamt of" (Shakespeare's Hamlet, Act I, Scene V) in western medical philosophy, the present investigation was undertaken.

The researcher, a student nurse-midwife, developed a casette-recorded intervention using the autosuggestive modality of guided imagery in order to improve both the experience and the outcome of pregnancy in women

having their first babies.

Significance of the Study

The cassette recording was designed to promote in pregnant nulliparas relaxation, acceptance of change, and confidence in their ability to cope, together with a generous placental blood supply in the absence of systemic hypertension, thus fostering optimal maternal and fetal outcome. The accomplishment of these goals through a standardized intervention, requiring little in the way of time or expertise from caregivers, would represent a significant contribution to prenatal care. The intervention had the additional benefit of allowing subjects a greater sense of participation in their own care and of power over their own bodies. These effects are consistent, both with nursing philosophy, which emphasizes self-care (Orem, 1980), and with the "Functions, Standards, and Qualifications" of the American College of Nurse-Midwives, which emphasizes consumer self-determination and active involvement in care (ACNM, 1983).

Hypotheses

The study addressed six hypotheses: a) In relation to baseline pressure, diastolic blood pressure at the end of 4 weeks will be significantly lower in subjects practicing the guided imagery intervention than in sub-

jects in the control group. b) Degree of proteinuria; incidence of fetal mortality; and incidence of small-for-gestational-age infants will be lower; and birthweight; gestational age at delivery; and 5-minute Apgar scores will be higher among subjects who practice the guided-imagery intervention than among those in the control group. c) In relation to baseline scores, state anxiety, as measured by the State-Trait Anxiety Inventory, will be lower at the end of 4 weeks in subjects who practice the guided-imagery intervention than in subjects in the control group. d) Locus of control, as measured by the Rotter Internal-External Scale (IES), will become significantly more internal in subjects who practice the guided-imagery intervention as compared to subjects in the control group. e) Among subjects in the experimental group, there will be a positive correlation between compliance with use of the tape and change from baseline IES scores to a more internal locus of control at 4 weeks. f) Among subjects in the experimental group there will be a negative correlation between baseline scores on the IES (lower scores are more internal) and compliance with use of the tape.

Assumptions

The study rests on three basic assumptions: a) There is an interconnection between mind and body such that conscious mental processes like imagery could

be used to control processes typically considered to be involuntary. b) Subjects in the experimental group practiced the imagery intervention as directed without supervision. c) Subjects in the experimental group reported accurately and truthfully how often they had practiced the intervention as directed.

Theoretical Grounding

In what sense is the present study a nursing study? The 1980 Social Policy Statement of the American Nurses' Association defines nursing as "the diagnosis and treatment of human responses to actual or potential health problems" (Loomis & Ward, 1983, p. 4). Loomis and Ward delineate six distinct response systems. The present intervention engages at least three of these: first, the physical, by prompting a relaxation response and encouraging dilatation and patency of the uteroplacental arteries with concomitant relaxation of the systemic arterioles; second, the emotional, by promoting a sense of power, capability, and inner resourcefulness; and third, the cognitive, by covertly developing concepts: namely that the mind can influence the body and that the unconscious forces that integrate bodily functioning have an innate wisdom and design.

In addition, the intervention requires no prescriptive authority or invasive procedure. Promotion of relaxation and positive suggestion are a time-honored

and proprietary part of nursing practice. Consider the traditional back rub or the nurse-prescribed suggestion, "this will make you feel better in about 10 minutes," that often accompanies the medically prescribed analgesic.

Orem defines the nurse's role as:

> 1. The maintenance of those self-care activities that individuals continuously need to sustain life and health, recover from diseases and injury, and cope with the effects of disease and injury, and
> 2. Self-regulation of the individual's self-care capabilities (1980, p. 18).

Certainly, positive autosuggestion can be construed as a self-care activity, and the possibility of voluntary control of autonomic functions by this means is "self-regulation of the individual's self-care capabilities" to a greater extent than even Orem may have imagined. Introducing the client to guided imagery and ensuring correct practice requires nursing intervention at the outset, with diminishing nursing involvement as the client becomes more adept at using the technique independently to promote her own health. This is certainly in harmony with Orem's second goal of nursing action: "moving the patient toward responsible action in matters of self-care" (Orem, 1980, p. 200).

Another nursing theorist, Sister Callista Roy, states that health involves adaptation to change, both internal and external, which is a constant fact of life.

She offers the model of adaptation reflected in Figure 1. In terms of this model, guided imagery can be viewed as the input, working through the cognator (the conscious self or dominant hemisphere) to access the regulator (the unconscious or nondominant hemisphere) and prompt it to activate any number of physiological, self-normalizing processes through effectors like the hypothalamus, the limbic system, etc. Success in self-regulation reinforces further efforts to apply positive suggestion in the form of guided imagery (similar to the positive reinforcement that occurs on a more obvious level with biofeedback).

Helping clients to take an active role in promoting health is both a nursing goal and a recognized component of the nurse-midwifery management process, which directs the nurse-midwife to provide "information to enable clients to make appropriate decisions and assume responsibility for their own health (Education Committee of the American College of Nurse-Midwives, 1979). In facilitating a client's use of positive suggestion through imagery, the nurse-midwife provides, not only information, but a powerful tool for self-regulation.

Conceptual Definitions

Guided Imagery

Guided imagery is defined as the purposeful, goal-directed production of mental images by a subject under

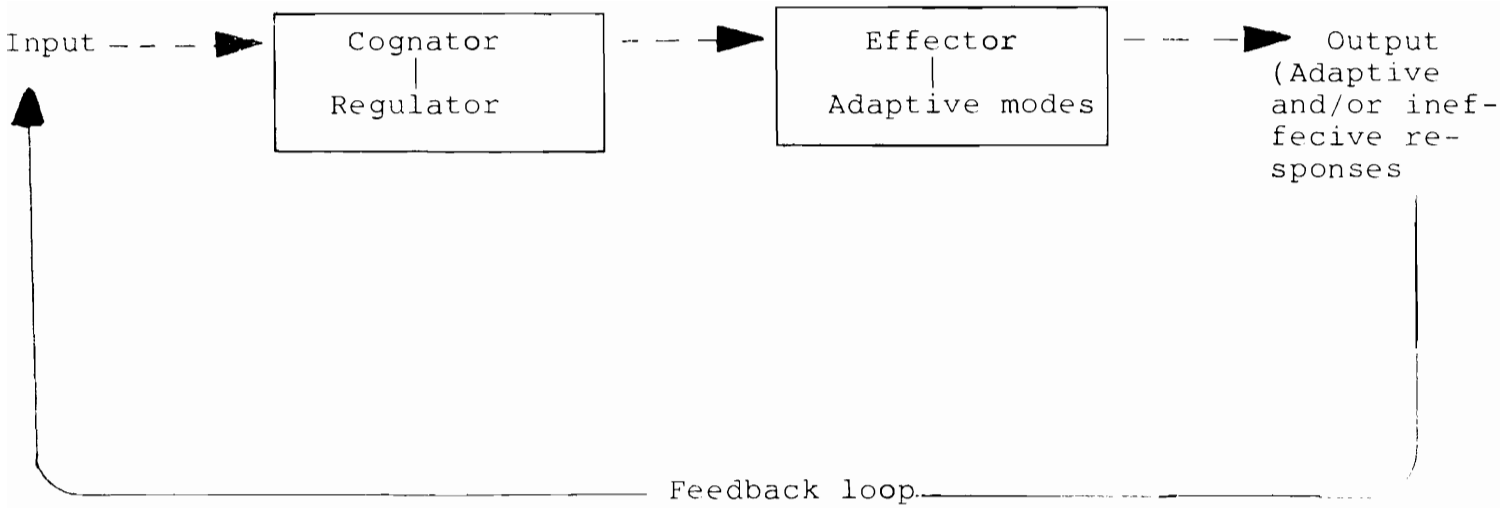

Figure 1. Model of adaptation (Adapted from Roy & Roberts, 1981).

the direction of another person. The definition is the researcher's composite, based on definitions of the key words taken from Webster's New Collegiate Dictionary (1970), and agrees with descriptions found in the literature (Bry, 1978; Oyle, 1975) of the same phenomenon called by a variety of names including "visualization," "passive attention," and "contention" among others.

Pregnancy-Induced Hypertension

Pregnancy-induced hypertension (PIH) for the purposes of this study encompasses the entities described by the Committee on Terminology of the American College of Obstetricians and Gynecologists (ACOG) under the labels "gestational hypertension," "preeclampsia," and "eclampsia" (Hughes, 1972):

> gestational hypertension - the development of hypertension during pregnancy, or within the first 24 hour postpartum, in a previously normotensive woman. No other evidence of preeclampsia or hypertensive vascular disease is present (p. 422).
>
> preeclampsia - the development of hypertension with proteinuria, edema, or both, due to pregnancy or the influence of a recent pregnancy. It occurs after the 20th week of gestation, but it may develop before this time in the presence of trophoblastic disease (p. 422).
>
> eclampsia - the occurrence of one or more convulsions, not attributable to other conditions such as epilepsy or cerebral hemorrhage, in a patient with preeclampsia (p. 422).

> hypertension - a rise in the systolic pressure of at least 30 mm of Hg, or a rise in the diastolic pressure of at least 15 mm of Hg, or the presence of a systolic pressure of at least 140 mm of Hg or a diastolic pressure of at least 90 mm of Hg. The levels cited must be manifest on at least two occasions 6 or more hours apart, and should be based on previously known blood pressure levels (p. 423).

Proteinuria

Proteinuria is the presence of protein in the urine.

Edema

Edema is defined by Hughes (1972) as "a general and excessive accumulation of fluids in the tissues, commonly demonstrated by swelling of the extremities and face" (p. 423).

Birthweight

This term refers to the first weight recorded for the newborn infant, expressed in grams.

Five-Minute Apgar

This is a summation of scores for vital signs of the newborn infant (heart rate, respiratory effort, muscle tone, reflex irritability, and skin color) at 5 minutes after birth (Friedman & Neff, 1977, p. 20).

Gestational Age

Gestational age refers to the duration of pregnancy as calculated by either Dubowitz or Ballard scores, expressed in weeks completed.

Small-for-Gestational Age (SGA)

SGA designates an infant having a birthweight less than the tenth percentile of expected weight based on the distribution of weights for infants of a given gestational duration at birth stratified by race (Friedman & Neff, 1977).

Fetal Mortality

Fetal mortality refers to the intrauterine death of a fetus weighing 500 g or more before or during labor, subsequently delivered with no objective evidence (spontaneous respirations and/or heartbeat) of life at birth (Friedman & Neff, 1977).

Anxiety

Anxiety refers to a state characterized by subjective feelings of "tension, apprehension, nervousness, and worry, and by activation or arousal of the autonomic nervous system" and to a trait characterized by

> relatively stable individual differences in anxiety proneness, that is, to differences between people in the tendency to perceive stressful situations as dangerous or threatening and to respond to such situations with elevations in the intensity of their state anxiety (Spielberger, 1970, p. 1).

Locus of Control

This refers to the source from which an individual perceives rewards as originating. It may be either within the individual or in forces outside himself (powerful others or change). Locus of control is internal when rewards are perceived as contingent on one's own behavior and attributes, and external when rewards are perceived as controlled by forces outside oneself and occurring independently of one's own actions (derived from Rotter, 1966).

Operational Definitions

Guided Imagery

This refers to the 30-minute sequence recorded on a cassette tape for use by subjects in the experimental group.

Pregnancy-Induced Hypertension (PIH)

PIH was considered to be present if this diagnosis was recorded on a subject's chart. Use of the terms "gestational hypertension," "preeclampsia," or "eclampsia," were considered to be equivalent to PIH. In every case, ACOG criteria were followed by caregivers in assigning the diagnosis.

Diastolic Blood Pressure

Diastolic blood pressure refers to the measurement made and recorded on the subject's charts by clinic

personnel during regular clinic visits.

Proteinuria

The measurement of urine protein recorded by clinic personnel during regular visits. All sites assessed protein semiquantitatively by dipping with Uristix, comparing color change in the protein test square with indicator colors shown on the bottle, and recording the results as negative (N), trace (T), 1+, 2+, 3+, or 4+.

Anxiety

Anxiety was defined separately as a state and as a trait in terms of scores on the State-Trait Anxiety Inventory (STAI); subjects with higher scores were considered to have more anxiety than those with lower scores.

Locus of Control

Locus of control, described as more internal or more external, was defined by subjects' scores on the Internal-External Scale (IES), with lower scores considered to be more internal and higher scores more external.

CHAPTER II

REVIEW OF THE LITERATURE

This chapter is divided into six sections. The first section focuses on the conceptual framework supporting the use of relaxation and autosuggestion to influence physiological processes. The second section discusses findings in the literature, both anecdotes and studies, relevant to relaxation and autosuggestion. The third section contrasts autosuggestion with other holistic-healing methods, namely biofeedback and hypnosis. The fourth section explores the various modalities of autosuggestion and attempts to extract the essential components of any autosuggestive method. The fifth section shows how the intervention developed for this study employs techniques found in the literature. The sixth and final section discusses support in the literature for the particular sample, measurements, critical values, and procedures selected for the study.

Conceptual Basis for Healing Suggestion

The conceptual basis for healing autosuggestion described in the literature reflects individual theorists'

grounding in physiology, psychology, religion, or some combination of the above.

From a religious point of view, self-healing is "miraculous," with divine intervention the effective agent and faith a necessary prerequisite. But, religion aside, some sort of "faith" does seem to be necessary for self-healing to take place. Oyle (1975) observes "If the patient firmly believes I know what I'm doing and I firmly believe in my therapeutic ritual, healing usually takes place..." (p. 20). From this perspective, one may begin to wonder how much of the action of drugs is really due to faith. Brono Klopfer's oft-quoted experience (Simonton, Matthews-Simonton & Creighton, 1978) illustrates this question: When the drug, Krebiozen, was first tested in 1950, it was touted as a "cure" for cancer. Klopfer administered it to a patient with advanced lymphosarcoma who was being maintained on oxygen with a thoracentesis every 2 days. There was a dramatic shrinking of tumors and the patient was able to resume a normal life. But as reports of the negative results of Krebiozen appeared in the popular press, the patient had a sudden relapse. He was dramatically cured, however, when Klopfer, claiming he had obtained a new super-refined double-strength dose of the drug, injected the patient with sterile water, the patient remained symptom-free for over 2 months until reports

in the newspapers stated with finality that Krebiozen had been proven to be worthless. After this verdict, the patient died within a few days (pp. 25-26).

In 1924, Baudoin observed:

> For our part, we believe that we can only get relief by having recourse to a pharmaceutical arsenal; and as long as we believe this, as long as we remain ignorant of the powers possessed by the brain over the rest of the organism, so long does our belief remain true, so long are we unable to do without the arsenal (p. 60).

In the psychological realm, "faith" becomes "expectancy," and as Gravitz (1981) points out:

> ...a patient's expectancy for results may significantly affect the outcome of treatment...Therapeutic suggestions and "illness" producing expectancies can, thus, be effective techniques for influencing the body's autoregulatory mechanisms (p. 282).

Grinder and Bandler (1981) emphasize the role of the caregiver in producing positive expectancies by means of their own "congruency." This refers to the caregiver's manifest self-confidence that the desired expectancy will occur and his/her ability to project this confidence to the patient. Grinder and Bandler also refer to this quality as "straight personal power" (p. 84). Its absence explains, perhaps, why replication studies involving autosuggestion are often unsuccessful.

Coue in 1922, asserted, "Every thought entirely filling our mind becomes true for us and tends to transform itself into action" (p. 15). He also made the

interesting proposal that every illness, unless it is exclusively mental, has both physical and mental aspects to the extent that:

> ...on every physical illness a mental one comes and attaches itself. If we give to the physical illness the coefficient 1, the mental illness may have the coefficient 1, 2, 10, 20, 50, 100, and more. In many cases this can disappear instantaneously, and if its coefficient is a very high one, 100 for instance, while that of the physical ailment is only 1, only the latter is left, a 101st of the total illness; such a thing is called a miracle, and yet there is nothing miraculous about it (p. 40).

This same Coue was a master of the art of suggestion, renouned for his "seances"--gatherings which attracted both skeptics and disciples--during which, literally, the blind saw and the lame walked. Coue believed that the unconscious controls the functioning of all organs by the intermediation of the brain, so that

> ...if it believes that a certain organ functions well or ill or that we feel such and such an impression, the organ in question does indeed function well or ill, or we do feel that impression (p. 7).

In addition, Coue believed that the unconscious could not only "repair the ill it has done, but cure real illness, so strong is its action upon our organism" (p. 13).

If the mind is able to affect organ structure and functioning, however, most authors insist that it is not <u>directly</u> by means of the will, but rather <u>indirectly</u>

through the unconscious. Coue, in fact, emphasizes the deleterious effects of "will power" on self-healing attempts, as do the originators of autogenic training, Schultz and Luthe. Coue's "laws" for the process of autosuggestion state that:

1. When the will and the imagination are antagonistic, it is always the imagination which wins, without any exception.

2. In the conflict between the will and the imagination, the force of the imagination is in direct ratio to the square of the will.

3. When the will and the imagination are in agreement, one does not add to the other, but one is multiplied by the other.

4. The imagination can be directed (p. 14).

Jung taught that power resides in images, and that the degree of power is measured by an image's ability to arouse emotion (Jung, 1964, p. 96). Both Jung and his teacher, Freud, believed that the unconscious "speaks" to us by means of imagery, so that both diseases and dreams may be said to have a symbolic function. Baudoin (1924) too claims, "Repressed suggestion is revealed to the consciousness by symbolism" usually in the form of illness (p. 96). Conversely, it may be possible for the conscious to "speak" to the body by way of imagery. Lang (1979) observes, "Imagery is accompanied by an efferent outflow appropriate to the content of the image" (p. 500).

The type of mind/body, consciousness/unconscious-

ness duality considered above finds its most scientific elaboration in the current recognition of a dual brain: In this model, the dominant verbal hemisphere (usually the left brain and sometimes referred to as the "male" hemisphere) is identified with the conscious self, while the imaging nondominant hemisphere (usually the right and often called the "female" hemisphere) communicates with its conscious half by means of symbols (including dreams and bodily changes). Oyle (1975) maintains: "If you have the physical or mental symptoms, you have created it in your female hemisphere in order to tell yourself something" (p. 49).

Paradoxically, discovery of the brain's duality has led to speculation about the unity of mind and matter. According to Von Franz (in Jung, 1964) "...it may prove to be that 'psyche' and 'matter' are actually the same phenomenon, one observed from 'within' and the other from 'without'" (p. 211). Jung himself was impressed by the number of unexpected parallelisms in psychology and physics, and pointed out the possibility of a psychophysical oneness of all life phenomena. He was even convinced that the "unconscious" was somehow linked up with the structure of inorganic matter, explaining the origin of psychosomatic illness. Oyle (1975) proposed that body tissue--matter--may be nothing more than a "precipitation" of energy (p. 44).

Oyle (1975) suggests that a symptom may actually represent an "internal feedback loop" between the conscious hemisphere and the body, so that after receiving such a message, the conscious self can expedite healing by "establishing a dialog" with the symptom (p. 44). In the same spirit, Grinder and Bandler (1981) recommend "talking" to one's symptom to try to obtain its message and to negotiate another way to communicate (p. 145):

> I always think of symptoms as being people's friends, not their problems, because I think of symptoms as communication channels. However, as with most communications between people, the purpose and the outcome is often forgotten.
>
> Symptoms, like people, don't always realize the difference between what they intend to communicate and what they do communicate (p. 143)

Dr. Paul Joire, one of Coue's medical contemporaries, proposed an early model to explain how the mind can affect the body. Considering the brain as the seat of nervous activity, he proceeds as follows:

> The muscles are set in movement by the nerves; the nerves regulate the circulation by their direct action on the heart and by their action on the blood vessels which they dilate or contract. The nerves act then on all the organs, and by their intermediation all the unhealthy organs may be affected (Coue, 1922, p. 41).

Oyle suggests that energy outflow from the right brain stimulates the hypothalamic and endocrine systems, which in turn regulate the body's autonomic processes

like heart rate, blood pressure, chemical balance, as well as the emotions (p. 48). He also suggests that, since the "female, form-creating right hemisphere" contains the body image, it can induce bodily states like cancer, arthritis, heart disease, and stroke by means of an unconscious command or picture of self-destruction (p. 40). The ability of imagery alone to produce all the bodily changes associated with, for example, sexual arousal, is but one example of the influence of mental or bodily processes. Another perhaps more prosaic, example is the well-documented effect of psychological stress on the menstrual cycle, so that stress is often associated with amenorrhea (Population Information Program, 1983).

Simonton et al. have developed a more detailed model of mind/body interaction, which they used to explain both the etiology of cancer and his success in inducing remissions by means of imagery. This model accounts, not only for autonomic changes, but for alterations in the functioning of the immune system as well: Psychological stress results in depression or despair, which acts through the limbic system to affect hypothalamic activity, which in turn regulates pituitary activity. This affects the endocrine system, and through it, both the immune system and the production of abnormal cells. The hypothalamus also has a direct influence

on the immune system, resulting in suppression of immune activity. All of these factors promote cancerous growth. On the other hand, psychological intervention like changing one's self-perception or perception of one's problems can result in hope and anticipation, which also act by way of the limbic system, the hypothalamus and pituitary, to restore balance in the endocrine system, increasing immune activity and decreasing the number of abnormal cells, promoting cancer regression (pp. 86 and 90). While the focus of Simonton et al. is on cancer, the model could just as well apply to other physical disorders.

One of the most interesting elaborations of the mind/body link is found in Galin's 1974 review of studies in psychology and neurology, attempting to link data from these disciplines. He found that hemispheric specialization, strikingly observed in patients with cerebral commisurotomy (severing of the corpus callosum which connects the two cerebral hemispheres), could account for the psychological concepts of the unconscious and of repression. The nondominant hemisphere (the right hemisphere in most individuals) correlates well with the concept of the unconscious. It uses a nonverbal mode of representation, presumable visual, tactile, kinesthetic, and auditory. It reasons in a nonlinear way, basing solutions to problems on "multiple converging

determinants" rather than a single causal chain. It excels in grasping the whole from just a part (hence its superiority in spatial relations), and is less involved with perception of time and sequence. While it seems to possess words, these are not used to form propositions (as in the left hemisphere) but to construct word-pictures as in metaphors, puns, and double-entendres. Its words have no fixed meanings, but depend on--and shift with--context, reflecting its holistic style, which prefers "complex patterns taken as a whole" to "individual parts taken serially" (p. 574).

In commisurotomy patients, each hemisphere is inaccessible to deliberate conscious access by the other. Galin hypothesizes that normal intact people can experience a functional dissociation of the two cerebral hemispheres analogous to the organic dissociation found after commisurotomy. Such dissociation is what the psychologists term repression. The two hemispheres may process the same information in distinctly different ways, and each hemisphere may actually sustain emotional responses and goals divergent from the other. If the mainstream of body activity and propositional speech are preempted by the left hemisphere, then the "unconscious ideation" of the right hemisphere must express itself through modes not so preempted. These would include somatic (e.g., psychosomatic and hysterical

disorders) and autonomic expressions (not surprisingly, some researchers claim that hysterical symptoms appear more often on the left side of the body, which is controlled by the right hemisphere) and dreams (Galin, 1974, pp. 576-577).

Thus organic disease may be at least sometimes an expression of the "mute" hemisphere when it is at loggerheads with its "verbal" counterpart. If this is the case, merely "paying attention" to the somatic/autonomic expression, and thus converting the message to conscious verbal forms, may be enough to relieve the disorder. Or it may be possible, through suitable right-brain-oriented input, to change the right hemisphere's emotional responses and goals.

While these general concepts are attractive, more recent research suggests that specific functions are not so neatly allocated to the left and right hemispheres, particularly in women, where distribution of function has been found to be more diffuse and more bilateral than in men (Durden-Smith & deSimone, 1983, pp. 48 and 57). For example, evidence now suggests that the left hemisphere can produce dreams, fantasies, and symbols, although these seem to be more unimaginative, concrete, and rigid than those associated with the right hemisphere (Hoppe in Gruzelier & Flor-Henry, 1979, p. 30). Thus, although the left hemisphere has

more absolute dominance for language, the "dominance" of the right hemisphere seems less clear.

Gruzelier and Flor-Henry (1979), therefore, rather than stressing the existence of different and independent hemispheric specializations, prefer to think of the brain as two functional systems, one characterized by the presence and one by the absence of linguistic organization. In place of hemispheric specialization they propose the concept of two hemispheric styles, one characterized by "nonverbal reactions" and the other by "a predilection for ideative, contemplative, and perhaps verbal expression of affect" (Bear & Fedio in Gruzelier & Flor-Henry, 1979, p. 32).

Instead of a functional split between hemispheres, Gruzelier and Flor-Henry (1979) hypothesize that,

> The splitting of functions...apparent in all forms of psychopathology, may plausibly have a counterpart in disordered connections among brain subsystems both within and between the hemispheres; subsystems with a working rather than an anatomical unity (p. 671).

In support of this idea are the results of a study by Stroebel and Glueck (1978) in which the practice of transcendental meditation (TM) by psychiatric patients resulted in significant improvement on a number of parameters. When electroencephalographic records of meditating patients were examined, they revealed high degrees of interhemispheric synchrony between the

temporal (76%), parietal (93%), and occipital (65%) leads as well as a high degree of intrahemispheric synchrony between the temporal and parietal (95%) areas (pp. 418-419).

The "disordered connections" described above may be the physiological counterpart to the psychoanalytic concept of repression, in which repressed material manifests itself in dreams and in a variety of dysfunctional behaviors (e.g., conversion reactions). Freud commented that dreams were "the first instance known to us of physical material being changed over from one mode of expression to another" (Freud, 1952, p. 29). Would it not be equally possible for repressed psychical material to be "changed over" to somatic or autonomic expressions? A recent compendium of current research suggests that this is certainly possible. Summarizing a number of animal studies, Weiner, Hofer, and Stunkard (1981) observe:

> In each instance animal experimentation has revealed the presence of forebrain connections [in a number of physiological changes] although these have not been fully unraveled (p. 5).

The following example from their own research demonstrates the effect of "the interpretation of life experience" on visceral responses among transfusion donors:

> In order to compensate for the loss of a half liter of blood and thereby maintain an adequate level of blood pressure, there occurs in the transfusion donor an automatic and widespread constriction of small arteries, thereby maintaining blood pressure in the face of blood loss by reducing the space in the body occupied by blood...when widespread arteriolar constriction occurs in the absence of blood loss, blood pressure is actually elevated. We observed such arteriolar constriction with blood pressure elevation in some transfusion donors before any blood was drawn, but in anticipation of the blood lost (Weiner et al., 1981, p. 3).

It was also possible to observe the same reaction in other subjects during a discussion of intimate personal conflict with no implication of blood loss. Decreases in blood flow to the kidneys as a result of this constriction persisted for a time after the increased blood pressure had subsided. This suggests the possibility that actual structural changes may be brought about (e.g., as a result of chronic blood deprivation) by initially "psychological" means.

Autosuggestion: Anecdotes and Studies

Now that the reader has been introduced to some theories supporting the use of imagery in healing, the obvious question is: How will it work for a modern clinician who cannot recomment meditation or mantras without raising eyebrows? Much of the avowed effectiveness of imagery rests on personal testimonial and anecdote. The reader can find a plethora of anecdotal

material in the works of Oyle (1975), Bry (1978), and Simonton et al. (1978). Coue (1922) describes curses of gout, tuberculosis, eczema, enteritis, paralysis, and more after appropriate suggestion--with improvement maintained on follow-up (pp. 29-34). The following accounts will suffice to give the reader some of the flavor of the anecdotal literature.

Gravitz (1981) describes the widespread and successful use of autosuggestive prescriptions and rituals by inhabitants of the Swiss canton of Vaud to evoke or heal warts. Stanton (1981) tells of his success employing the homeopathic "drug," Equisetum in conjunction with guided visualization to maximize its placebo effect in order to induce cessation of chronic bedwetting in a 14-year-old boy after 2 days. Repeating this method with 17 other patients, he was successful with all but 4--and even for these, the frequency of bedwetting decreased. Meares (1979) cites a remission of diagnosed adenocarcinoma of the bowel in which a patient who had been unable to move his bowels without an enema at the outset, had pencil stools after 2 weeks of daily meditation for 1 to 2 hours and nearly normal stools after 6 months. Bry (1978) describes the case of a 55-year-old patient of Dr. Rossman who had suffered severe pain from a tightened urethra since the age of 11. By "drawing a picture" of her bladder in her mind,

using on it all the instruments urologists had used on her, and then mentally filling it with drops of water until it was so full she felt she could not stand anymore, she was able to stretch both her bladder and her urethra so that her physical symptoms had been gone for 3 years at the time of writing (pp. 85-86).

While anecdotes are doubtless more colorful, bona-fide experimental studies of relaxation and imagery are on the increase. In a 1972 study by Sargent, Green and Walters, 74% of migraine sufferers improved after they were trained to increase blood flow to their hands through relaxation and the use of autogenic phrases accompanied by biofeedback (autogenic phrases are simple statements about physical phenomena--e.g., "My hand feels warm."--repeated over and over until what is described occurs). In a controlled study on the effectiveness of relaxation and guided imagery to relieve anxiety and nausea, Lyles, Burish, Krozely, and Oldham (1982) assigned 50 chemotherapy patients to an experimental group who used guided imagery or to control groups who received either support and encouragement during treatment or nothing at all. The first group reported significantly less anxiety and depression and less nausea at home after chemotherapy. Simonton et al. (1978) cite evidence from their own study of 159 patients with a diagnosis of medically incurable malignancy and an

average life expectancy of 12 months. Sixty-three of these, using guided imagery, were still alive after 24.4 months, and those who died had lived an average of one-and-a-half times longer than control subjects. Of those alive at the time of writing, 22.2% (14) showed no evidence of disease, 19.1% (12) showed tumor regression, 27.1% (17) were stable with no disease progression, and 31.8% (20) showed new tumor growth (p. 11). Oyle (1975) notes that in the earlier studies of Simonton et al. at Travis Air Force Base, they found that treatment effects correlated with patients' attitudes. Even so, only 4 out of 50 patients in the experimental (imagery) group had a poor response, while 74% had a good to excellent response--and of the 12 with an excellent response, 8 had been given less than a 50% chance for cure.

Levine, Gordon, and Fields (1978), studying the placebo effect, found that patients receiving placebos could be classified as "responders" or "nonresponders," depending on whether or not they experienced relief of pain (evaluated on a visual analog scale) following administration of the placebo for postoperative analgesia. Among responders, the beneficial effects of the placebo could be reversed when the narcotic antagonist, naloxone, was given as a second drug. This suggests not only that the placebo effect probably involves the production of actual physical entities

(endorphins) resembling narcotics, but also that certain people are better able to produce these entities (i.e., to respond to the suggestive effects of a placebo) than others. The relation of this ability to "attitude," identified as a key factor by Simonton et al., remains to be explored. The existence of such an ability also helps explain why autosuggestive interventions are not uniformly successful with all subjects.

The number of controlled studies demonstrating a significant positive physiological effect from relaxation and guided imagery is too great to permit description here. Relaxation, mantra-type meditation, and imagery have been used successfully to increase heart rate (Carroll, Marzillier & Merian, 1982; Carroll, Marzillier & Watson, 1980; Lang, Kozak, Miller, Levin & McLean, 1980), to lower blood cholesterol (Cooper & Aygen, 1979), and to relieve hypertension (Bali, 1979; Patel & North, 1975; Peters, Benson & Peters, 1977; Redmond, Gaylor, McDonald & Shapiro, 1974; Stone & DeLeo, 1976). For studies involving still other physiological functions, the reader is referred to the bibliography.

Two studies, however, are of special interest because they deal with PIH, a disorder peculiar to pregnancy, and particularly to pregnant nulliparas. Plotti, Palla, Guarighia, Castaldo, and Bompiani (1981) found that women attending a 2-month course in respiratory

autogenic training for childbirth preparation experienced significantly ($p < 0.005$) decreased symptoms of EPH gestosis (a British term analogous to PIH) compared with matched control subjects. The researchers suggest that these results may have been due to the higher socioeconomic status of the women attending the training course, to a better understanding and practice of health habits, or to emotional quiet and decreased anxiety resulting from the training. Wimmer-Puchinger and Muller-Tyl (1981) observed the following personality traits in women with EPH gestosis: a) increased psychovegetative disturbances (lability prior to pregnancy), b) negative experience of social resonance, c) repressed affective impulses (especially aggression), d) increased anxiety readiness, e) higher levels of guilt feelings, and f) higher scores on birth anxiety. Subjects were divided into three groups: a control group, a group that was trained in progressive muscle relaxation followed by a tape to use at home, and a group given two sessions per week of group psychotherapy (Rogerian) aimed at increasing self-perception and self-acceptance. Upon completion of the study, both experimental groups showed lower anxiety scores and increased normalization of blood pressure (most of those who had been on medications were able to discontinue them). Surprisingly, the progressive relaxation group showed even better

results than did the psychotherapy group.

Autosuggestion Versus Biofeedback and Hypnosis

While biofeedback is frequently used in studies involving autosuggestion, it does not appear to be an essential component of therapy (although it may speed the healing process and facilitate "resistant" cases). Blanchard, Andrasik, Neff, Arena, Ahles, Jurish, Pallmeyer, Saunders, Teders, Barron, and Rodichok (1982) treated 91 patients who suffered from chronic headache (including tension, migraine, and mixed types) with relaxation exercises, reserving biofeedback for those not helped by relaxation. Most subjects noted significant improvement with relaxation alone.

Blacker (1980) suggests that biofeedback provides a kind of positive reinforcement in that

> ...confirmation that the desired changes are being brought about can be 'fed' back to the patient by monitoring the changes...and permitting him to see the results (p. 787).

Thus it may speed the healing process by teaching the body when it is "on target," eliminating any trial-and-error groping for the right response. In addition, it may be useful for subjects who doubt their ability to effect "involuntary" physiological changes through autosuggestion alone.

On the other hand, Ikeda and Hirai (1976) found

that subjects who did better at controlling spontaneous electrodermal fluctuations with biofeedback also scored high on both use of imagery in daily life and intensity of autonomic self-perceptions. If a therapist believes that the body has the "wisdom" to make the correct response to achieve the suggested goal, and if he/she is able to instill a similar confidence in the subject, then the paraphernalia of biofeedback may prove unnecessary. Herzfeld and Taub (1980) compared 8 subjects who used biofeedback alone to raise hand temperature with 8 subjects who used biofeedback in combination with slide projections and suggestions relating to thermal experiences. The mean temperature of the suggestion group was significantly ($p < 0.01$) higher than that of the nonsuggestion group. Unfortunately, a group using suggestion alone was not studied. Silver and Blanchard (1978), after reviewing a number of studies on the use of both biofeedback and relaxation for the improvement of physiological problems like essential hypertension, migraine, premature ventricular contractions, asthma, and others, concluded that one method showed no consistent advantage over the other. Frankel, Patel, Horowitz, Friedewald, and Gaarder (1978) were unable to decrease baseline blood pressure in 22 subjects using biofeedback and relaxation together over a 16-week period, although they were able to lower pressure during the clinic

sessions. In a review of this and other studies on blood pressure control using biofeedback and/or relaxation, Frumkin, Nathan, Prout, and Cohen (1978) suggest that relaxation is more generalizable than biofeedback (unless it has been strictly associated with biofeedback), which is able to lower blood pressure only when subjects are actually receiving feedback. With relaxation protocols designed for home use, blood pressure remained lower, even when subjects were not practicing the relaxation exercise.

Finally, many physiological processes do not lend themselves to biofeedback, either because no satisfactory measurement has yet been designed, or because measurement would require costly, and/or invasive procedures. If many physiological processes are inaccessible to biofeedback, many subjects seem to be inaccessible to traditional methods of hypnosis. Barber (1980), however, discovered that many of the same subjects who were nonsusceptible to hypnosis according to the Stanford Clinical Scale were able to obtain relief from the pain of cancer through nonauthoritarian indirect suggestion. Such suggestion stressed that the subject, not the clinician, was creating the comfort through learning ways of thinking and feeling and reinterpreting sensation.

Alman and Carney (1980) reaffirmed Barber's finding that standard susceptibility tests are poor

predictors of response to indirect hypnotic techniques and insisted, moreover, that indirect suggestions are more successful in producing posthypnotic behavior. Indeed, as early as 1922, Coue maintained, "Autosuggestion is nothing but hypnosis" (p. 12) with the added advantage that many persons who resist being put to sleep, when told that sleep is unnecessary, easily go into a suggestible state (p. 24). Baudoin (1924) attributes the relatively longer duration of autosuggestion (in comparison with traditional hypnotic suggestion) to the fact that, with hypnosis, the subject attributes powers to the hypnotiser and imagines that in the absence of the cause (the hypnotiser) there can be no effect (p. 124); in autosuggestion, the healing power, by contrast, are internalized.

Autosuggestion: Options and Essentials

The actual practice of healing autosuggestion encompasses many variations but only three essentials: a) induction of a suggestible state by means of relaxation and/or distraction of the conscious self or dominant hemisphere; b) accession of the unconscious self or nondominant hemisphere; and c) delivery of the suggestion to the unconscious self or nondominant hemisphere.

Relaxation presupposes absence of volitional effort.

Thus one does not will the desired change to happen, but simply states (or "pictures") that it is happening. Bry (1978) suggests that relaxation is a prerequisite because "in a relaxed state the body's self-regulatory processes work at their best, the body is receptive and highly focused concentration is possible" (pp. 84-5). Schultz and Luthe (1969) make a distinction between active and passive concentration. While active concentration is characterized by the subject's concern, interested attention, and goal-directed efforts in respect to the final, functional result; passive concentration "implies a causal attitude and functional passivity toward the intended outcome of concentrative effort" (p. 14) -- a relaxed attitude, in other words.

Baudoin (1924), using the term "voluntary attention" in the same sense as "active concentration." explains that this state of mind "synthesizes both the idea and the resistance which this idea has to being thought." Thus two conflicting ideas arise which neutralize each other. If the sentiment of effort and resistance predominates, it will yield negative results whose dimensions will be proportional to the efforts one makes to avoid them (pp. 123-4). Because in the relaxation the attention no longer tries to fix on anything, inward and repressed conditions are encouraged to pass through the mind in the form of "evanescent images" of "mobile and rapid

reveries" (Baudoin, 1924, p. 136). Thus relaxation favors an "outcropping of the subconscious" as the usual rational inhibitions are suppressed (Baudoin, pp. 128-134). This ideal suggestible state resembles the state just before waking and sleeping, which Baudoin calls a state of "spontaneous outcropping" (p. 152).

Subjects may attain a state of relaxation through different methods. Slow deep breathing is an almost universal accompaniment of relaxation exercises, from ancient yogic practice to the present day. Baudoin (1924) accounts for its effectiveness by proposing that deep breathing fulfills three functions: a) it provides a sensation of well-being; b) the rhythm immobilizes the attention and tends to induce hypnosis; c) known relationships between the faculty of attention and the function of breathing have suggestive value (p. 169). Many practitioners of healing suggestion today favor a form of relaxation induction similar to that advocated by Jacobson (1938). Instead of a "relaxed state," Schultz and Luthe (1969) speak of attaining an "autogenic state," that is, a state "not identical with apparently similar phases of sleep or hypnosis" which "facilitates autogenic (brain-directed, self-generating, self-regulatory) processes of a self-normalizing nature" (p. 1).

The relaxed state is characterized by alpha waves on electroencephalographic recordings. Galin (1974)

reports relatively higher alpha waves (which he sees as a measure of "idling") over the right hemisphere during verbal tasks, and relatively more alpha over the left hemisphere during spatial tasks (p. 573). Thus, instead of traditional relaxation exercises, Bandler and Grinder (1975) advocate "distraction" of the conscious, dominant hemisphere in order to gain access to the unconscious, nondominant hemisphere. Both may be accomplished through the use of language that preoccupies the conscious, rational, language-processing self by means of ambiguities, use of nouns without clear referential indices, use of predicates that do not "fit" with their subjects (e.g., "A tomato plant can feel good...")--these and other language-oriented distraction techniques are described more fully in their 1975 commentary on the hypnotic techniques of Erickson. While the conscious self is preoccupied with "decoding" these messages, the unconscious is responding directly to the "gestalt" of the message embedded in this outpouring of language and often highlighted by tonality (referred to as "analogical marking"). For example, when Erickson says to the subject, "A tomato plant can FEEL GOOD," the subject's conscious self wrestles with the problem of how feeling good can be predicated of a tomato plant, while the unconscious self, left unguarded by rational processes, is free

to respond to the embedded command, "feel good." If several embedded commands are all focused on the same suggestion, the results, suggest Bandler and Grinder (1975) can be very powerful.

Coue and Baudoin achieved a similar effect with language through a different mechanism: repetition. In the manner of a mantra, the desired change was formulated in a simple positive phrase and repeated over and over. One can imagine that, as the conscious rational self was preoccupied with the propositional content and/or lulled by the repetition of the selected phrase, the "command" embedded in the phrase could be given access to the unconscious self.

Bandler and Grinder (1975) emphasize that there are many other ways in which a person can access his/her unconscious by distracting the conscious self or by directly activating the nondominant hemisphere: For example, one may play a melody inside one's head, assume a particular body posture associated with certain kinesthetic sensations (p. 190), or "see" a picture in one's mind (p. 185). Of this last method, they observe that

> ...one of the most direct and powerful of the nondominant hemisphere accessing techniques found by hypnotists is that of having the client create visual images in his mind's eye...[This] facilitates transfer of control from the dominant to the nondominant hemisphere" (p. 185).

(The image must be realistic--even sensual--however;

production of more intellectual "schema" is an activity of the dominant brain and will not result in accession of the nondominant side).

The final step in autosuggestion, actual delivery of the suggestion, is already incorporated in some of the techniques described above. The mantra, for example, simultaneously distracts the dominant hemisphere, accesses the nondominant, and delivers the suggestion. Coue achieved success with many clients by directing them to "fix" on the matter of the autosuggestion while repeating several times without thinking of anything else: "This thing is coming (going away); this thing will happen; etc." and assured them, "If the unconscious accepts the suggestion, it will be realized in every particular" (p. 12). Schultz and Luthe (1969) in their autogenic training exercises, also had subjects mentally repeat suggestions of heaviness, warmth, or cooling (among others) in order to produce the corresponding bodily sensations (p. 175), and, when these were successfully elicited, moved on to more specific healing suggestions.

A few recent studies of imagery take a less sanguine view of its potentialities. Lang (1979) suggests that, beyond the imagery script itself, a given subject's imagery response depends on their actual experience with the context and ability to generate an emo-

tional image. Some subjects process only verbal responses. He did find, however, that women tend to be more responsive than men to imagery instructions. He also observed that response-plus-stimulus propositions produced more arousal than stimulus propositions alone (stimulus propositions describe what is going on around the subject; response propositions describe what is going on within the subject: Cf. "You are surrounded by billowing clouds of steam" with "You choke as you attempt to inhale clouds of steam and feel your lungs fill with water"). Lang et al. (1980) confirmed the superiority of response over stimulus scripts, but found, additionally, that some physiological processes seem to be less influenced than others by internally elicited thoughts. Thus they found it rather easy to control heart rate, but more difficult to affect skin conductance. Shapiro and Lehrer (1980) were unable to differentiate heart-rate or skin-conductance responses to loud noises between subjects given autogenic or relaxation training and control subjects. They suggest that the effects of both are nonspecific. Carroll et al. (1982) were able, with response scripts, to change heart rate and respiratory rate significantly, but not skin conductance. The degree of change was unrelated to reported vividness of imagery or to difficulty in complying with the script's directions. Like Shapiro and

Lehrer, they conclude that there is no evidence that propositions pertaining to a particular system occasion specific changes in that system, but rather that certain propositions (like suggestions pertaining to heart and respiratory rates) are more effective than others (like dermal and sudomotor suggestions).

Such reports are, at first sight, discouraging. When one looks more closely, however, one finds confounding variables in these studies. In the Shapiro and Lehrer study all subjects were aware that they were going to be exposed to a loud noise. It may be that such anticipation allowed control subjects to prepare for the noise or that anticipation made it impossible for experimental subjects to truly relax or to enter into an autogenic state. In the study by Lang et al. (1980) progressive relaxation was used simply to reduce background physiological levels and variability. Furthermore, the "imaging" scripts were presented over 50 seconds, and subjects were given 30 seconds to image the scenes. In the Carroll et al. (1980) study, subjects were simply asked to relax for 10 minutes before each experiment and were given 1 minute for imagery production. There seems to have been no attempt made in these studies to access the unconscious, and the researchers' interest was confined to physiological changes occurring during the practice of imagery rather

than to baseline changes that might occur as a result of imagery. This is somewhat analogous to describing the effects of exercise by measuring an athlete's heart and respiratory rates in the middle of a workout.

Finally, creating a state in which the organism can use its "innate wisdom" to alter maladaptive responses and restore homeostasis is quite different from inducing the same state for the purpose of producing autonomic "performances" unrelated to the body's homeostatic needs.

Activation of the sensory modalities associated with the nondominant hemisphere, besides being an effective means of accession, can be an equally effective way of delivering the healing suggestion. Drs. Greene of the Menninger Clinic assert then

> ...the normally involuntary, unconscious sections of one's self can be induced to behave in ways that are consciously chosen by visualizing what is wanted, asking the being (body, mind, brain, unconscious, or whatever) to do it, and then detaching oneself from the results (Oyle, 1975, p. 85).

Bry (1978) dubs this variant of autosuggestion, using a visual mode, "programmed visualization" and directs practitioners to "form in your mind a very precise and clear picture of what you need and then hold it, affirm it, and see it as being yours" (p. 43). Oyle (1975) recounts the story of a woman who, upon being told that she needed surgery for cervical cancer, left her job

and, in meditation, visualized a "normal, healthy, beautiful uterus." On returning to her doctor some time later, she was told that the cancer had disappeared (p. 55). He also describes another patient with glaucoma who was able to reduce her intraocular pressure to normal by "picturing fluid running out of her eyelids through a spigot" (p. 74). The common denominator in these and similar cases cited by Oyle is the manipulation of mental images with the typical finding that "creating a vivid picture of healing resulted in healing on the somatic level" (p. 74). As Bandler and Grinder (1975) have observed, it is also possible to transmit such healing suggestions by other modalities (e.g., a feeling of warmth, the sound and feel of a cooling breeze...), and these may be more successful with subjects whose dominant sensory mode is nonvisual. Thus, a blend of sensory modes is probably advisable in any standardized exercise.

The Intervention

The intervention employed in this study makes use of an eclectic combination of techniques. From Jacobson's (1938) progressive relaxation comes the technique of alternately tensing and relaxing different muscle groups. The attempt to induce a vivid sensual experience of ample blood flow supplying the placental roots is modeled after the manner of Oyle (1975) and Bry (1978).

In addition, the intervention employs some of the Ericksonian techniques described by Bandler and Grinder (1975) and incorporated into neurolinguistic programming. These include elements of pacing (proceeding from the subject's actual experience in order to develop credibility (e.g., "You may notice the warmth, the feel of the pillow...") as well as process suggestions ("carte-blanche" statements largely devoid of objective content, which must be supplied by the subject; e.g., "And you may find that it feels good...to think about changes..."). In contrast to the sensual specificity generally associated with guided imagery, process instructions endeavor to be as nonspecific as possible, in order both to allow the subject's unconscious to become engaged in providing the missing details and to avoid disrupting the suggestible state induced by progressive relaxation with descriptions that may clash with visualizations the subject has already constructed.

Thus, despite the intervention's very <u>general</u> descriptions the goal is to induce in the subject a highly specific, vivid, and engaging experience of the above. The subject, not the tape, creates the imagery.

The attentive reader will have noticed in the intervention several embedded suggestions as well: suggestions of power and adequacy, of ability to nurture without detriment to the self, of acceptance of change,

and of the body's innate wisdom. The goal here is a new self-perception designed to minimize anxiety. The literature suggests that creating a more relaxed life-style by developing a different outlook is essential for generalizing the effects of relaxation and imagery on blood pressure to daily living (Patel & North, 1975; Peters et al., 1977; Stone & DeLeo, 1976).

The success of the intervention as a whole rests ultimately on the shared "faith" of researcher and subject that there is some mechanism in people that is capable of healing--but that this mechanism, in the words of Grinder and Bandler (1981) "needs to be convinced, it needs to be motivated, it needs to be communicated with and provided a context in which to respond" (p. 177). The present intervention hoped to provide that context.

The researcher was concerned about the possibility of doing harm by means of ill-advised suggestions made through ignorance of the scope of physiological processes involved or by way of dredging up disturbing material from the unconscious to the subject's level of awareness. To these concerns, Schultz and Luthe (1969) reply,

> The adaptational functions of brain-designed programming appear to be guided by principles aiming at the greatest possible degree of self-normalizing efficiency in a given functional situation (p. 187).

They offer further assurance that "brain-directed processes of unloading of disturbing material (autogenic abreaction) unfold with an unmatched precision of biologic wisdom" (p. 183) which

> ...appears to extend to the finest detail as far as the physiological requirements for selective release of neuronal impulses and relevant inhibitory functions are concerned. Undue spreading of excitation of physiologically damaging intensities of discharges have not been observed in over 10,000 abreactions (p. 188).

Erickson (in Bandler & Grinder, 1975) observed a similar protective effect with hypnotism: The release of disturbing material accessed in the hypnotic state was "revealed" to the subject's conscious self only gradually, as the conscious self was able to accept it.

Finally, in support of this attempt to harness the power of positive imagery, the researcher recalls an observation made by Fryling (1982) that we already use negative imagery, probably much more than we realize (Note 1). Baudoin (1924) observes:

> Every time you allow yourself to complain of your lot, to say, "I am poor; I can never do what others do; I shall never be rich; I have not the ability that others have; I am a failure; luck is against me" you are laying up so much trouble for yourself (p. 87).

From this perspective, the practice of positive guided imagery, if it does nothing else, should provide a

salubrious counterbalance to lifelong habits of negative imagery.

Rationale for Selection of the Sample, Measurements and Critical Values, and Procedures

The Sample

The intervention aims to promote relaxation, acceptance of change, confidence in one's ability to cope, and a generous placental flow in the absence of systemic hypertension. The researcher speculated that, among pregnant women, nulliparas would stand most in need of these factors. Of particular concern was the awareness that PIH, a disorder that remains one of the three leading causes of maternal death and may lead all others as a definable cause of fetal death (Friedman & Neff, 1977, Introduction), is predominantly a disorder of primigravidas (Hughes, 1972, p. 422). Since there is no medical cure for PIH, and since management is directed at abatement of the symptoms of hypertension, proteinuria, and edema primarily through bedrest, the tape seemed to be an ideal adjunct in the prevention and treatment of PIH.

Furthermore, since prior birth experience, in addition to personal and environmental factors, would constitute an intervening variable, this was an added reason for limiting the sample to nulliparas. It was

felt that they would present a more homogeneous group for study.

Measurements and Critical Values

Diastolic blood pressure and proteinuria. Selection of these parameters was based on results of the National Collaborative Perinatal Project (NCPP). This prospective study of 55,908 pregnant women lasted 7 years, from 1959 to 1965 and was conducted at 15 medical centers affiliated with 12 universities in different parts of the United States (Niswander, 1982). A special task force headed by Friedman and Neff was appointed to analyze data relevant to hypertension in pregnancy for purposes of establishing diagnostic criteria. The following diagnostic variables were evaluated: gestational age, systolic and diastolic blood pressures, maternal weight (including change, gain, and loss), edema, and proteinuria. Evaluation of these variables addressed the significance of maximal, minimal, first, last, and mean values; standard deviation; average rates of change (both absolute and directed); maximal and minimal directed rates of change; and patterns of sequences. The data above were also stratified according to collaborating institution, race (black or white), age, and parity.

Analysis of data revealed only two variables that

correlated significantly with the risk of adverse outcome, defined as the risk of having: a) a stillborn fetus, b) a neonate that would not survive, or c) one that would not develop normally if it did survive. These critical variables were diastolic blood pressure and proteinuria maxima obtained during the third trimester. Other variables either had no clear correlation with outcome or correlated so well with the variables above that they were redundant (Friedman & Neff, 1977). Thus systolic blood pressure was not used as a variable in this study because it normally correlates with diastolic pressure and thus provides little added information.

In 1967, Thomson, Hytten, and Billewicz had suggested that edema--even generalized edema--might be physiological in pregnant women and not, in itself, an ominous sign. They observed generalized edema in 35% of normotensive patients. The NCPP determined that, even when superimposed on proteinuria, edema did not affect outcome criteria (Friedman & Neff, 1977, p. 111). More specifically, they asserted that "edema neither contributes deleteriously nor beneficially diminishes the principal effect of proteinuria on outcome" (Friedman & Neff, 1977, p. 167).

By the same token, weight gain of even 3 pounds per week was not associated with significant risk of

fetal death. Weight loss, however, was associated with neonatal death and long-term adverse effects, but, since it correlated closely with low diastolic blood pressure, it was not useful as a separate factor (p. 164).

Deep-tendon reflexes were not evaluated by the NCPP task force. They were not used in this study because their measurement is highly subjective, with different clinicians often in disagreement about the degree of hyperreflexia in the same patient.

Measurements of fetal outcome. These were judged necessary since so little is known about homeostatic mechanisms in pregnant women. Several authors have suggested that hypertension in pregnancy may be a compensatory factor in assuring placental circulation (Gant & Worley, 1980; Sehgal & Hitt, 1980; Symonds, 1980). Thus the body, even while responding to the guided-imagery exercise with an increase in placental flow, may "choose" to maintain this flow by means of systemic hypertension. In this event, only outcome criteria would be relevant. Conversely, normal blood pressure does not assure an adequate blood supply to the placenta and fetus.

The outcome criteria selected are those found to be most indicative of less-than-optimal outcome by the NCPP task force on hypertension in pregnancy. While death versus survival served as the criterion in earlier

NCPP studies, the task force was concerned with more sensitive indicators of adverse outcome. Factors investigated included fetal death, neonatal death, perinatal mortality, depressed, 1- and 5-minute Apgar scores, low fetoplacental weight ratio, low birthweight, designation of small-for-gestational age (SGA), birthweight based on standard deviations from the mean and stratified by race and duration of pregnancy at delivery, abnormal 8-month Bayley mental and motor scores, abnormal 8-month global evaluation, abnormal 1-year neurological examination, and defective 4-year IQ scores.

Of these, the most critical outcome factors related to the risk factors surveyed were fetal death (and therefore perinatal mortality as well), low birthweight, SGA designation, and 4-year IQ scores.

Because of time constraints, 4-year IQ was not a feasible criterion for the present study. The other criteria were adopted, however, and the 5-minute Apgar retained as well. Reasons for retaining the Apgar include tradition (Jennett, Warford, Kreinick & Waterkotte, 1981, noted that "few if any pertinent papers are published that do not use the score as an outcome criterion" p. 201) and a plethora of data attesting to its usefulness as a predictor of future handicap (see below). Such predictive ability was thought to be needed since the 4-year IQ was not used.

Nelson and Broman (1977) found Apgar scores of less than 6 at 5 minutes and birthweight less than 2,000 grams to be significantly ($p < 0.001$) increased among 50 severely handicapped subjects in comparison with 34,432 control subjects. While the risks of mortality and later abnormality were much higher for infants under 2,000 grams than for those weighing between 2,000 and 2,500 grams, the relatively greater numbers in the heavier birthweight category outweighed in importance the greater risks of smaller babies by contributing substantially larger numbers of children at risk (Hardy, Drage & Jackson, 1979, p. 36). For this reason, 2,500 g was the standard for low birthweight used in this study.

Small size in relation to gestational age (SGA) was found by Friedman and Neff (1977) to be a strong indicator of long-range outcome, significantly ($p < 0.01$) associated with adverse outcome. While they defined SGA as less than the fifth percentile of expected weight, most clinicians consider weight less than the tenth percentile in defining SGA (Korones, 1981, p. 106). SGA by this criterion is still associated with adverse outcome and the present study used the broader criterion.

Anxiety. Several researchers have suggested that women with PIH are more likely to be anxious than other pregnant women (Pajntar, Rojsek & Blejec, 1981; Plotti

et al., 1981; Wimmer-Puchinger & Muller-Tyl, 1981), but the type of anxiety has not been discriminated. The present study explored the effects of relaxation on anxiety in women at risk for PIH and compared anxiety levels of such women with means established for working adults. People with high trait-anxiety (T-anxiety) are likely to exhibit more frequent state-anxiety (S-anxiety) increases. In general, scores on S-anxiety increase in response to both physical danger and psychological stress and decrease as a result of relaxation training (Spielberger, 1970, p. 2).

Locus of control. Locus of control refers to the

> ...degree to which the individual perceives that the reward follows from or is contingent on his own behavior and attributes versus the degree to which he feels the reward is controlled by forces outside of himself and may occur independently of his own actions (Rotter, 1966, p. 1).

It has been hypothesized that belief in external control of reinforcement is related to general passivity. If individuals perceive rewards as resulting from their behavior, they are more likely to repeat the behavior in question. This perception is more likely to take place if a task is seen as involving skill rather than chance (Rotter, 1966). Meares (1979) states that in experiences in healing through daily practice of meditation, introverts typically did better than extraverts.

Hypothesis 6 suggests that subjects who emphasize internal control will be more likely to practice the guided-imagery intervention.

Nurse-midwifery espouses a philosophy of "participative management." This requires that clients believe that they can optimize their health status by appropriate behaviors. Such clients view health maintenance as a matter of "skill" rather than "chance," and thus should be more likely to emphasize internal overr external control of reinforcement. There is also the possibility that subjects, in the course of practicing the intervention, may achieve a heightened sense of personal power in being able to control their own bodies--and thus may become mroe "internal." This is hypothesis 5.

Procedures

Although a schedule of thrice-daily sessions was used successfully by Simonton et al. (1978) and Blacker (1980), it was felt that once-a-day use was as much as could be expected from well women. Subjects were told that they could use the tape more frequently--and that they should us it three times a day in the event that their caregiver prescribed bedrest because of rising blood pressure. Although the researcher met with subjects for baseline studies and again at the end of 4 weeks, a follow-up meeting or telephone call was scheduled

at some time during the 4 weeks for ongoing assessment of the subject's experiences with the tape and the number of times it was used per week. This was also to encourage faithful practice and to correct any misconceptions or performance errors. Control subjects were also contacted in order to minimize intergroup differences. A brief inquiry was made about stressors in their life and their coping strategies.

CHAPTER III

METHODOLOGY

The Sample

The study sample was a convenience sample of 22 caucasian women from a sampling frame of all nulliparas between 32 and 36 weeks gestation at four clinics (three nurse-midwifery clinics and one family-practice clinic) in the Salt Lake and Utah Valleys during the winter, spring, and summer quarters of 1984. Subjects ages ranged between 15 and 30 years. Of those contacted, no potential subjects refused to participate.

Recruitment Procedures

Written permission to collect data at these sites and to review charts was obtained along with access to lists of potential subjects arranged according to expected date of delivery. From this list, nulliparas were identified, and all who could be reached (some had no scheduled appointments and no telephone) were recruited as they arrived for clinic appointments, some having been previously contacted by telephone.

Subjects were assigned to either the experimental or the control group on a random systematic basis:

By flip of a coin with heads denoting the experimental group, the researcher assigned the first subject to the experimental group. Every subsequent odd-numbered subject recruited was also assigned to the experimental group and every even-numbered subject to the control group, until 22 subjects were recruited (this number represented the entire eligible population who could be contacted).

The researcher approached each prospective subject and: a) explained the purpose of the study as "to assess the effects of stress on women who are having their first babies;" b) encouraged prospective subjects to read the consent form and to ask questions about the information contained therein; and c) answered subjects' questions and obtained their written consent to participate in the study.

The Study Design

An experimental design was used. Optimal similarity between groups was achieved by randomly assigning subjects to each group. The independent variable was the intervention recorded on a cassette tape. Subjects in both groups received the usual prenatal care from their respective caregivers.

Dependent variables included measures of diastolic blood pressure and proteinuria. These two factors were validated as most predictive of fetal outcome by the

NCPP. Measurements of these variables were made by clinic personnel as part of each subject's usual prenatal care, and data were obtained by chart review.

Dependent variables directly measuring fetal outcome were obtained after delivery by review of the delivery and newborn records. These included mortality, incidence of SGA, birthweight, gestational age at delivery, and 5-minute Apgar scores.

Dependent variables of locus of control and anxiety were measured upon entry into the study and after 4 weeks by the researcher, using the Rotter Internal-External Scale (IES) and the Spielberger State-Trait Anxiety Inventory (STAI). The design is summarized in Figure 2.

Maximal values of diastolic pressure and proteinuria between the last testing session and delivery were also obtained. Measurements of fetal outcome were obtained after delivery.

Measurements

Diastolic Blood Pressure

Methods. Diastolic blood pressure was obtained during clinic visits by clinic personnel. The highest diastolic pressure recorded between the end of the study sessions and the onset of labor (postsession pressure) was also obtained from the clinic record.

Sessions

Group	Baseline	1-wk.	2-wk.	3-wk.	4-wk.
1	0_bX	X daily 0_s	X daily 0_s	X daily 0_s	X daily 0_s
2	0_b	0_s	0_s	0_s	0_s

0_s = measures of diastolic blood pressure and proteinuria

0_b = measures of both the above plus locus of control and anxiety

Figure 2. Study design.

Reliability and validity. Diastolic blood pressure was found to be significantly associated with increased risk of fetal mortality by the NCPP ($p < 0.001$). This association was made despite differences in equipment and in clinicians throughout the study. The present study is not aiming to quantify association but merely to compare two groups at risk. While diversity of clinic personnel and equipment may have introduced a threat to interrater reliability, the threat was diminished by having experimental and control subjects distributed at random through all sites. An advantage of having measurements performed by clinic personnel is that they were made "blind," thus reducing the threat of bias.

Proteinuria

Methods. Proteinuria was measured during clinic visits according to the procedure described in the operational definition. The highest proteinuria value between the end of the study sessions and onset of labor was obtained from the clinic record.

Reliability and validity. Proteinuria was found to be significantly ($p < 0.001$) associated with increased risk of fetal mortality by the NCPP. In this study proteinuria was measured by clinic personnel using Uristix (Ames). Uristix are capable of detecting as little as 0.1 g/dL of glucose and as little as 5 mg/dL of protein (more specific for albumin). Amounts of

each are read as color changes which match one of six color blocks on the container. Readings are divided into clinically significant units. Colors are distinct so that there is likely to be little disagreement between readers except on the "negative" and "trace" squares for protein (which are grouped together as one for purposes of this study in any case). The researcher conducted informal tests of interrater reliability between herself and clinic personnel: After 10 tests, reliability stood at 100%.

Tests of Fetal Outcome

Methods. Incidence of fetal mortality, birthweight, gestational age at delivery, and 5-minute Apgar scores were taken from the delivery or newborn records. Determination of SGA was made by comparing birthweight with the NCPP distribution of birthweights stratified by race, sex, and gestational age. Any infant with a birthweight below the tenth percentile for a given gestational age was considered to be SGA.

Reliability and validity. Fetal death as a criterion of poor outcome requires no further discussion, since it was determined in this study only after delivery by absence of vital signs.

SGA status was found by Friedman and Neff (1977) to be a strong indicator of long-range outcome, significantly ($p < 0.01$) associated with perinatal death,

abnormal 8-month global, abnormal 1-year neurological, and abnormal 4-year IQ scores (p. 140).

The Dubowitz and Ballard Scales were used to determine gestational age. The Dubowitz comprises 10 neurological and 11 external criteria. Test-retest reliability was established by multiple assessments of 70 infants over 4 days and proved to be independent of the state of the baby. The scale also has proven interrater reliability. Gestational age assigned by the scale was compared with gestational age based on reliable dates for 167 cases, and a correlation coefficient of 0.93 was obtained. The error of prediction is considered to be 1.02 weeks for a single score and 0.7 weeks with an average of two independent assessments (Dubowitz, Dubowitz & Goldberg, 1970).

The Ballard Scale has six neurological and six physical criteria. While interrater reliability was not addressed by Ballard, Novak, and Driver (1979), since the Ballard criteria are taken from the Dubowitz Scale, and since the results of both scales correlate well, reliability is assumed. Validity was established by comparing gestational age by Ballard Score with gestational age by reliable dates and by the Dubowitz Scale. The correlation with gestational age by reliable dates was 0.969 at $p < 0.00001$.

Nelson and Broman in 1977 found birthweight less

than 2,000 grams and Apgar scores of less than six at 5 minutes to be significantly increased ($p < 0.001$) among 50 severely handicapped subjects in comparison with 34,423 control subjects. Nelson and Ellenburg (1979) found the incidence of cerebral palsy (CP) to be significantly ($p < 0.001$) increased in the presence of low birthweight and low 5-minute Apgar scores. Their study was able to demonstrate this relationship despite a number of examiners with different degrees of training and experience.

Anxiety

Methods. The STAI consists of 40 self-evaluation statements followed by multiple-choice scales that describe the extent to which the statement applies to the subject. State questions (20) deal with how the subject feels right now and trait questions (20) with how the subject usually feels. Choices on the State scale are: "not at all," "somewhat," "moderately so," and "very much so." Choices on the Trait scale are: "almost never," "sometimes," "often," and "almost always." The scale is entitled Self-Evaluation in order to conceal its real purpose. Subjects should be able to complete the test in a maximum of 20 minutes. Norms for the test are based on a sample of 451 female employees of the Federal Aviation Administration, heterogeneous with respect to educational level and age. The test

language is at a sixth-grade reading level.

Reliability and validity. Test-retest reliability for T-Anxiety showed a median *r* of 0.765 for college students and 0.695 for high-school students, while S-Anxiety showed a median *r* of 0.33. This is in accord with expectations, since S-Anxiety should reflect the influence of situational factors. The test demonstrated internal consistency with overall median alpha coefficients for S- and T-Anxiety of 0.92 and 0.90 respectively.

Construct validity and concurrent validity have both been demonstrated. Convergent validity is shown in significant correlations of S- and T-Anxiety with measures of psychopathology and emotional disturbance on the MMPI and with scores on the Cornell Medical Index (*r* = 0.70). Divergent validity is shown in low correlations between STAI scores and the Beta Test (*r* = 0.03 to 0.08), which measures intelligence and scholastic aptitude, and with a number of other scales (Speilberger, 1983).

Locus of Control

Methods. The IES is a 29-item forced-choice test, including six filler items designed to make the purpose of the test more ambiguous. Subjects were told it was a questionnaire "to find out the way in which certain important events in our society affect different people"

(Rotter, 1966, p. 26). The test is scored so that the upper half of the normative distribution's scores are classified as "external" and the lower half as "internal." The reference distribution comprised 575 male and 605 female Ohio State elementary psychology students.

Reliability and validity. The test has demonstrated consistent test-retest reliability at 1 month (except that subjects usually score one point less external on the second test) in range of 0.60 to 0.83. The higher coefficient is associated with female subjects.

Internal consistency has been shown to be in the range of 0.65 to 0.79. Construct validity is demonstrated by significant correlations between the IES and several other measures described in more detail in Rotter (1966).

The IES shows discriminant validity in its low correlation with standardized tests of intelligence, social desirability, and need for approval. There is, however, some correlation with race and social class, with blacks and members of the lower socioeconomic strata scoring more external.

The Intervention

The cassette was given to three persons, one psychologist and two nurses, and their comments and suggestions were requested. Recommendations included a general slowing of tempo and more frequent pauses to

allow images to develop, a more subdued and relaxed tone of voice, and the incorporation of background music. These suggestions were implemented in a second recording, which is the version used in the study. Client input was solicited throughout the present study with a view to future modifications.

Instructions to Subjects

Subjects in the experimental group were given written instructions for use of the tape and were asked to continue to use it until delivery. They were also asked to keep a record of the number of times the tape was used. These subjects were requested not to discuss their use of the tape with other patients.

Procedures for Clinic Sessions

At the first session, after baseline measurements were obtained, subjects in the experimental group received a brief oral introduction to guided-imagery and to the cassette tape, followed by presentation of written instructions. Subjects' access to a cassette player was verified and, when necessary, a player was supplied by the researcher for the duration of the pregnancy. Subjects were also presented with small tablets for the purpose of recording their experiences and problems with the intervention. The researcher contacted these subjects at subsequent visits or by telephone

in order to note the number of times the intervention was being used and to assess any problems or questions regarding use of the tape. All subjects were asked about their problems and experiences with stress and about the coping methods they used. These questions were designed chiefly to spread the researcher's attentions evenly over both groups.

CHAPTER IV

ANALYSIS OF DATA

Sample-size calculation was based on diastolic blood pressures. An N of 22 per group would have allowed 90% power to detect a 10 mm Hg difference between groups at the 5% significance level, assuming the standard deviation of an individual blood pressure to be 9 mm Hg and assuming a 10% dropout rate. Unfortunately, only 22 subjects (11 per group) were available during the study's time frame. A sample size of 11 per group could not guarantee statistical significance.

Diastolic Blood Pressure

Diastolic pressures, including the highest antepartum pressures for each subject between the 4th-week session and onset of labor (referred to as "postsession" blood pressure), were averaged and graphed as weekly and postsession means for each group. Baseline differences between groups were compared by two-sample t-tests and the means of 4th-week pressures for both groups were compared for significant differences using analysis of covariance (ANCOVA) to control for initial differences in blood pressure between groups. The means of post-

session pressures were similarly analyzed.

Proteinuria

Proteinuria results were categorized in three groups: 0 - trace, 1+, and 2+ or greater. Baseline differences between groups were assessed by Pearson's chi-square. Group differences in severity of proteinuria at 4 weeks were compared in relation to baseline values using a Mantel-Haenszel chi-square. Comparison of postsession values was similarly analyzed.

Fetal Mortality

Group differences in incidence of fetal mortality were to be compared using a chi-square but there were no fetal deaths in either group.

Incidence of Small for Gestational Age (SGA)

Infants were characterized as "SGA" or "not "SGA." Group differences in incidence of SGA were compared using a chi-square.

Birthweight

Birthweight was categorized as "less than 2,500 grams" or "2,500 grams or greater." Group differences in birthweight were compared using a chi-square.

Gestational Age at Delivery

Gestational age in weeks was compared between groups using a t-test for independent means.

Five-Minute Apgar Scores

Apgar scores cf. between groups using a t-test for independent means t-test.

Anxiety

Scores of state anxiety on the STAI for both groups at week four were compared for significant differences, controlling for baseline differences by means of ANCOVA. Baseline differences between groups were compared by the two-sample t-test.

Locus of Control

Fourth week scores on the IES for both groups were compared for significant differences, controlling for baseline differences by means of ANCOVA. Baseline differences between groups were assessed by a two-sample t-test. Pearson r tests were computed to determine the correlation between compliance with use of the tape (expressed as a percentage) by experimental subjects and change in locus of control at 4 weeks and between compliance and baseline locus of control.

CHAPTER V

RESULTS

One subject in the control group agreed to participate in the study but then failed to complete the tests. She was eliminated from the study. Three subjects in the experimental group and one in the control group remained undelivered at the time the study was completed, so that fetal outcome data were unavailable for these subjects. Two subjects in the experimental group and two in the control group delivered before 4 weeks and did not complete the tests of anxiety and locus of control. Another subject in the control group completed the test of anxiety but not that of locus of control. Since these subjects delivered between the third and fourth weeks of the study, fetal outcome data on these subjects were used. One subject in the control group inadvertently failed to complete her baseline test for trait anxiety. All other data for this subject were used. Complete data were obtained on 9 subjects in the experimental group and 6 in the control group.

Diastolic Blood Pressure

Results of analysis of covariance (ANCOVA) appear in Table 1. Diastolic pressure was not significantly lower among subjects in the experimental group. Thus Hypothesis I, which states, "In relation to baseline pressure, diastolic blood pressure at the end of 4 weeks will be significantly lower in the experimental group than in the control group," was not supported.

Proteinuria

There was no proteinuria beyond a trace in the control group. In the experimental group, one subject had a baseline proteinuria of 2+, another had a 1+ reading at 4 weeks, and still another had a postsession reading of 1+. None of these higher readings was repeated. Comparing groups at 4 weeks in relation to baseline, the Mantel-Haenszel chi-square value was .125. This was not significant ($p = .724$). Thus the data did not support Hypothesis II.A. which states that degree of proteinuria will be lower in relation to baseline at 4 weeks among subjects in the experimental group.

Incidence of Small Size for Dates (SGA) and of Fetal Mortality

There were no fetal deaths in either group. There was one instance of SGA in the experimental group and one in the control group with 9 subjects in each group. Since data were identical, no analysis was required.

Table 1

Effects on Diastolic Blood Pressure at 4 Weeks

Group (n = 17)			Experimental (n = 9)			Control (n = 8)			
Blood Pressure	M	SD	Adjusted M	M	SD	Adjusted M	df	F	p
Baseline	62.91	5.24		62.40	7.23				
4-Week	66.00	7.00	65.68	64.00	11.41	64.32	1	.091	.767

These data do not support Hypotheses II. B. and C., which state that incidence of fetal mortality and SGA will be lower in the experimental group.

Birthweight, Gestational Age, and Five-Minute Apgar Scores

Results of *t*-tests on these factors are shown in Table 2. They do not support Hypotheses II. D., E., and F., which state that birthweight, gestational age, and Apgar scores will be higher among subjects in the experimental group.

State Anxiety

Results of ANCOVA are shown in Table 3. They do not support Hypothesis III, which states that state anxiety will be lower at 4 weeks in relation to baseline among subjects in the experimental group.

Locus of Control

Results of ANCOVA are shown in Table 4 and Figure 3. They do not support Hypothesis IV, which states that locus of control will become significantly more internal among subjects in the experimental group.

The relationship of compliance to locus of control is shown in Table 5. There was a positive correlation between compliance and change from baseline to a more internal locus of control at 4 weeks and this was significant at $p = .017$. These data support Hypothesis

Table 2

Effects on Birthweight (D), Gestational Age (E), and 5-Minute Apgar Scores (F)

Group Factor	Experimental (n = 9) M	SD	Control (n = 9) M	SD	t	df	p
Birthweight	3281.56	254.95	3383.11	691.30	-.41[a]	10.14[a]	.688[a]
Gestational Age	40.22	1.48	39.44	1.01	1.30	16	.212
Five-Minute Apgar	8.99	.33	8.67	.50	1.11	16	.284

Note. [a] = separate variance estimate used because of large difference in SDs.

Table 3

Effects on State Anxiety

Group (n = 17)	Experimental (n = 9)			Control (n = 8)					
S-Anxiety	M	SD	Adjusted M	M	SD	Adjusted M	df	F	p
Baseline	38.78	9.51		38.38	10.24				
4-Week	41.56	12.79	41.38	39.88	9.64	40.05	1	.116	.738

Table 4

Effects on Locus of Control (IES)

Group (n = 16)	Experimental (n = 9)			Control (n = 6)					
IES	M	SD	Adjusted M	M	SD	Adjusted M	df	F	p
Baseline	11.78	1.64		8.25	3.96				
4-Week	12.22	3.27	10.19	8.14	3.34	10.17	1	.000	.989

Table 5

Relationship of Compliance to

Locus of Control (IES)

IES	Pearson *r*	*p*
Baseline	-.322	.200
Change	-.707	.017

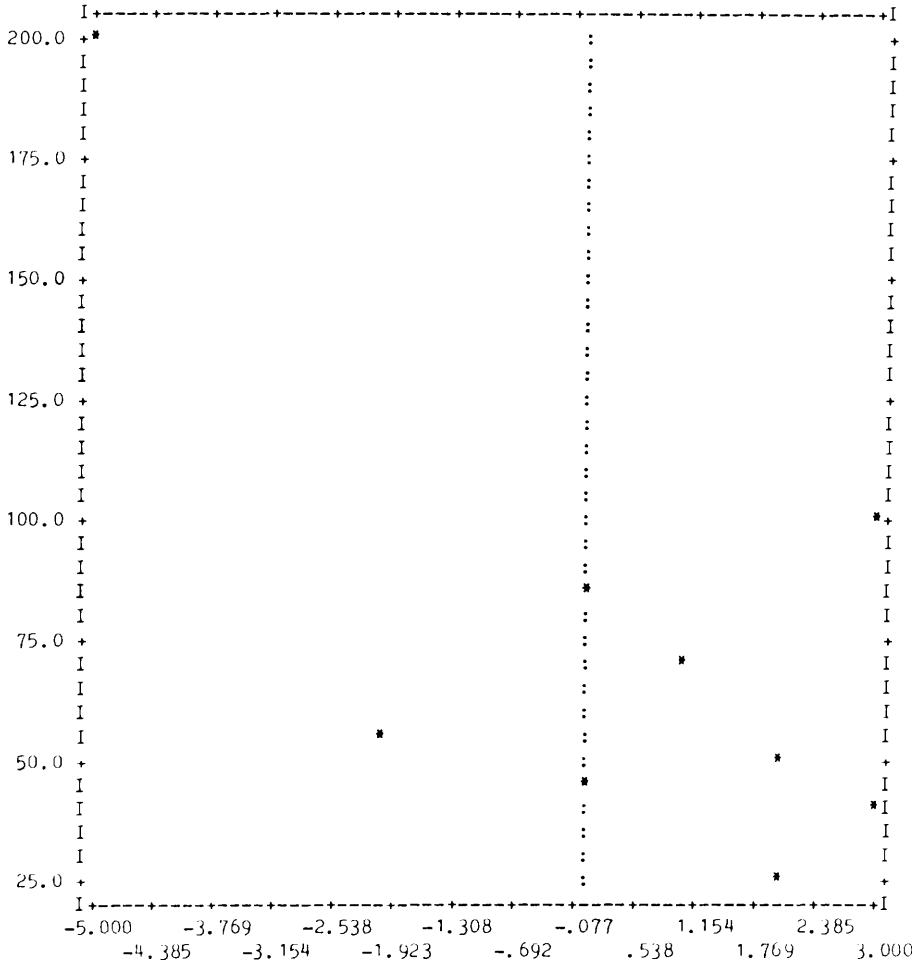

Figure 3. Plot of IES change and percentage of compliance.

V.

There was a slight, but nonsignificant (p = .200) correlation between baseline locus of control and compliance. These data do not support Hypothesis VI.

In summary, the data fail to support Hypotheses I, II, III, IV, and VI. They do, however, show clear support for Hypothesis V.

CHAPTER VI

DISCUSSION

Although only Hypothesis V, which states that there will be a positive correlation between compliance and change to a more internal locus of control, was supported by the data, the degree of correlation (.707) and its significance (p = .017) suggest that poor compliance (Table 6) may have been a key factor in the researcher's failure to find significant differences between groups. Indeed, while only 3 subjects demonstrated 100% compliance, 4 showed compliance of 50% or less.

Two critical differences between this study and those studies already cited which demonstrated significant changes in involuntary physiological processes (e.g., Bali, 1979; Cooper & Aygen, 1979; Patel & North, 1975; Peters et al., 1977; Redmond et al., 1974; Stone & DeLeo, 1976) are the factor of noncompliance and the absence of a presenting problem of concern to subjects.

In those studies, compliance appears not to have been an issue. On the other hand, all subjects in these studies had an identified problem or goal (e.g., to lower blood pressure). Subjects in the present study were not selected on the basis of any identified problem

Table 6

Compliance Expressed as a Percentage by Subjects

Compliance	Cumulative Frequency
Less than 25%	0
Less than 50%	3
Less than 75%	3 (cumulative 6)
Less than 100%	2 (cumulative 8)
100% or better	3

or goal. It is interesting to note that the 1 subject who did have an identified problem (pregnancy-induced hypertension) achieved the most positive results with the tape, maintaining a satisfactory blood pressure until the onset of labor. This subject also lowered her state anxiety by 12 points and her locus-of-control score by 5 points.

It is generally accepted that people are more motivated to rid themselves of a disorder than to prevent its occurrence in the first place. Since most subjects in the study were well women, their only reason for using the tape (apart from accommodating the researcher) was to attain a higher level of relaxation and well-being or to prevent potential disorders of pregnancy. There is no certainty that either goal was of actual interest to subjects.

The data suggest that, for properly motivated subjects, baseline locus of control would not limit a subject's ability to benefit from the intervention. It may be that "internal" subjects see the tape as a tool allowing them to assume even greater control over their own bodies, and that "external" subjects (initially) regard the tape as an outside force able to produce beneficial changes which they would be powerless to produce on their own (the relationship of compliance to locus of control at 4 weeks, however, suggest

that at some point the power of the intervention is internalized).

Besides its motivating effect, a presenting problem allows for measurable therapeutic change. The image suggested by the intervention was one of optimal blood flow under optimal pressure. It is possible that most subjects already had optimal blood pressure. The researcher had theorized that there would be more evidence of hypertension since preeclampsia occurs in about 7% of all pregnancies and since its incidence is highest among nulliparas.

Although fetal outcome measures are needed to ensure that the fetus is not being jeopardized by any decreases in blood pressure, to expect significant differences to show up in the offspring of subjects who received the experimental treatment after 32 weeks gestation is probably unrealistic.

The science of embryology (Moore, 1982, pp. 93-110) shows that, based on gestation age (dating from the last menstrual period), body growth is greatest between weeks 11 and 22 (crown-rump length doubles during weeks 11 to 14). Although growth in length slows during weeks 19 to 22, there is substantial weight gain from week 23 to week 28 as subcutaneous fat forms. All of this growth takes place before the third trimester. Growth (mainly weight gain due to fat deposition) slows

after 37 weeks. It slows even earlier in cases of poor nutrition or twins and in smokers.

In order to detect demonstrable differences, the intervention should probably be started much earlier and continued longer. Even then, any advantage to the fetus might not be discernible in a group of women without obvious pathology.

Most of the literature on autosuggestion states that some form of belief or trust on the part of subjects is essential: if not belief in the method, then at least belief in the authority or personal power of the one proposing it. An entire book by Herbert Benson, Beyond the Relaxation Response (1984), has been devoted to what he calls the "faith factor." This work reiterates the earlier conclusions of Baudoin (1924), Oyle (1975), Gravitz (1981), and Grinder and Bandler (1981). Subjects in this study were not selected for their belief, or even interest, in the method, and the researcher, who was not the primary caregiver, was not in a position to demonstrate authority or personal power. On the contrary, it was felt that to do either of these would confound the results by introducing the researcher's position or personality as an intervening variable. An important feature of that tape was that it should have its effect independent of the efforts of the caregiver.

Finally, a study of this sort was unable to exclude a number of potentially confounding variables. For example, attendance at prenatal classes was not considered; nor were life stressors like unemployment, lack of transportation, estrangement from the father of the baby, discomforts of pregnancy, etc. Such factors may have had a profound impact on anxiety and locus of control. With such a small sample, the experimental and control groups may have differed significantly in these respects.

Other Findings

There were no significant trends in diastolic blood pressure means during the course of the intervention. Weekly means are graphed in Figure 4. In addition, there were no significant differences between groups on either postsession diastolic blood pressure or on trait anxiety (see Tables 7 and 8).

Out of the entire sample, 4 subjects (19%) had scores at least 1 SD above the reference mean on state anxiety at baseline as did 6 of the 17 (35%) who completed the test at 4 weeks. Similarly, 10 (48%) subjects scored more than 1 SD above the reference mean toward the external end of the scale on locus of control at baseline, as did 6 (38%) out of the 16 completing the test at 4 weeks. This evidence of heightened anxiety and external locus of control corroborates Caplan's

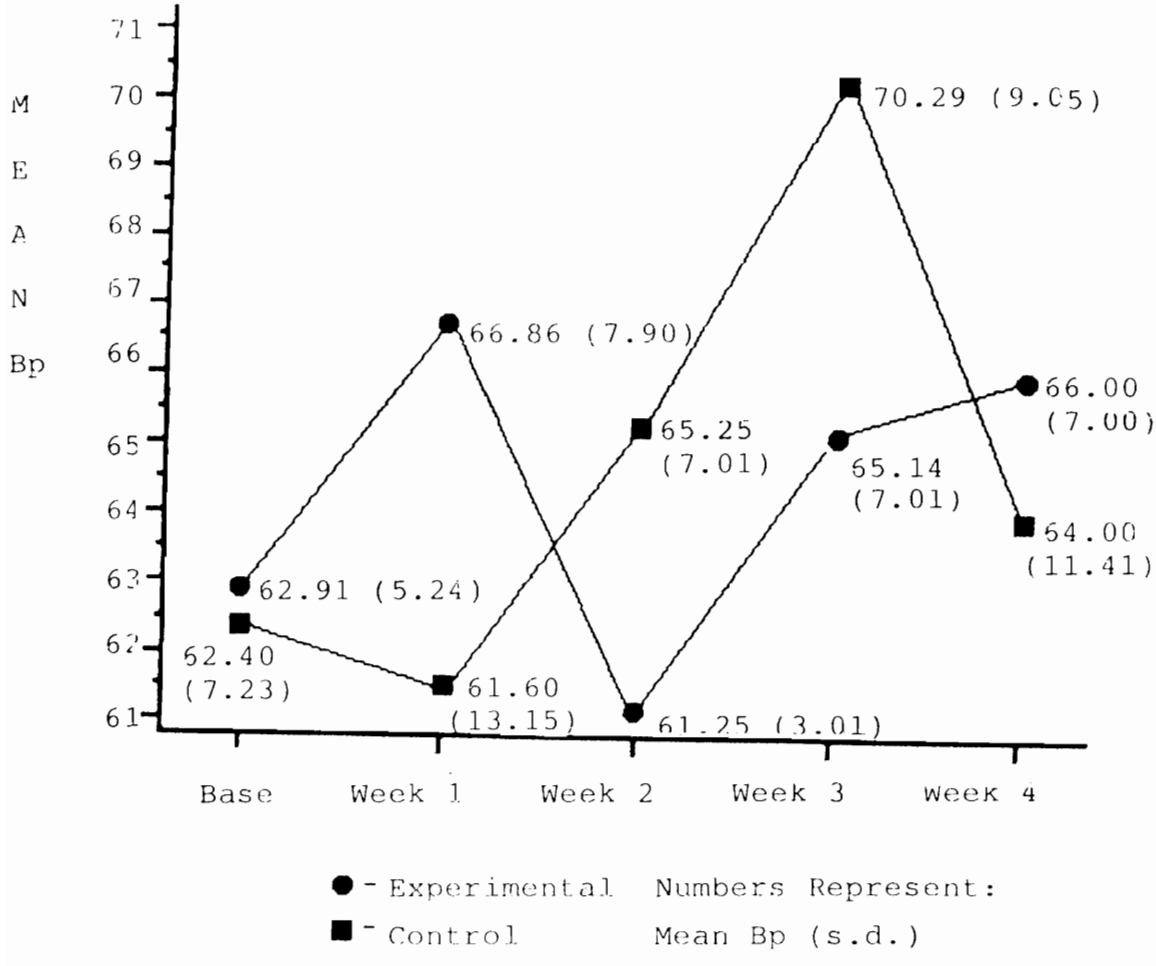

Figure 4. Weekly means of diastolic blood pressure.

Table 7

Effects on Postsession Diastolic Blood Pressure

Group (N = 9)	Experimental (n = 6)			Control (n = 3)					
Blood Pressure	M	SD	Adjusted M	M	SD	Adjusted M	df	F	p
Baseline	62.91	5.24		62.40	7.23				
4-Week	66.00	7.00	65.68	64.00	11.41	64.32	1	.091	.767

Table 8

Effects on Trait-Anxiety

Group (n = 16)	Experimental (n = 9)			Control (n = 7)					
T-Anxiety	M	SD	Adjusted M	M	SD	Adjusted M	df	F	p
Baseline	40.78	11.26		39.86	9.32				
4-Week	40.00	10.74	39.62	36.75	11.06	38.67	1	.079	.783

(1957) classical description of the latter part of pregnancy as a time of anxiety, passivity, and dependence.

The relationship between compliance and change in state anxiety was even more striking than the hypothesized relationship between compliance and locus of control. This highly significant and strong correlation is described in Table 9 and shown in Figure 5. These results lend added support to the issue of noncompliance as a factor in the study's failure to demonstrate most of its hypotheses.

Change in trait anxiety (see Table 9) did not have the same relationship to compliance as did state anxiety and locus of control. Such a relationship was not expected because trait anxiety is, first of all, a more enduring characteristic and might be expected to change only very slowly over time, if at all, since it is based on subjects' memories of how they "usually" are.

The response of subjects to the tape was surprisingly favorable. Five subjects freely volunteered enthusiastic comments (e.g., "It really helps me relax;" "I use it more than once a day;" "I used it in early labor because it helped me relax so well;" "I especially liked the part where..."). Three of these subjects requested to keep the tape. Another 5 responded "politely" that the tape was "OK" or "nice" when they were asked how they liked it. Only 1 subject made the

Table 9

Relationship of Compliance to State- and Trait-Anxiety

	Pearson *r*	*p*
S-Anxiety		
Baseline	.206	.298
Change	-.738	.012
T-Anxiety		
Baseline	-.111	.387
Change	-.219	.285

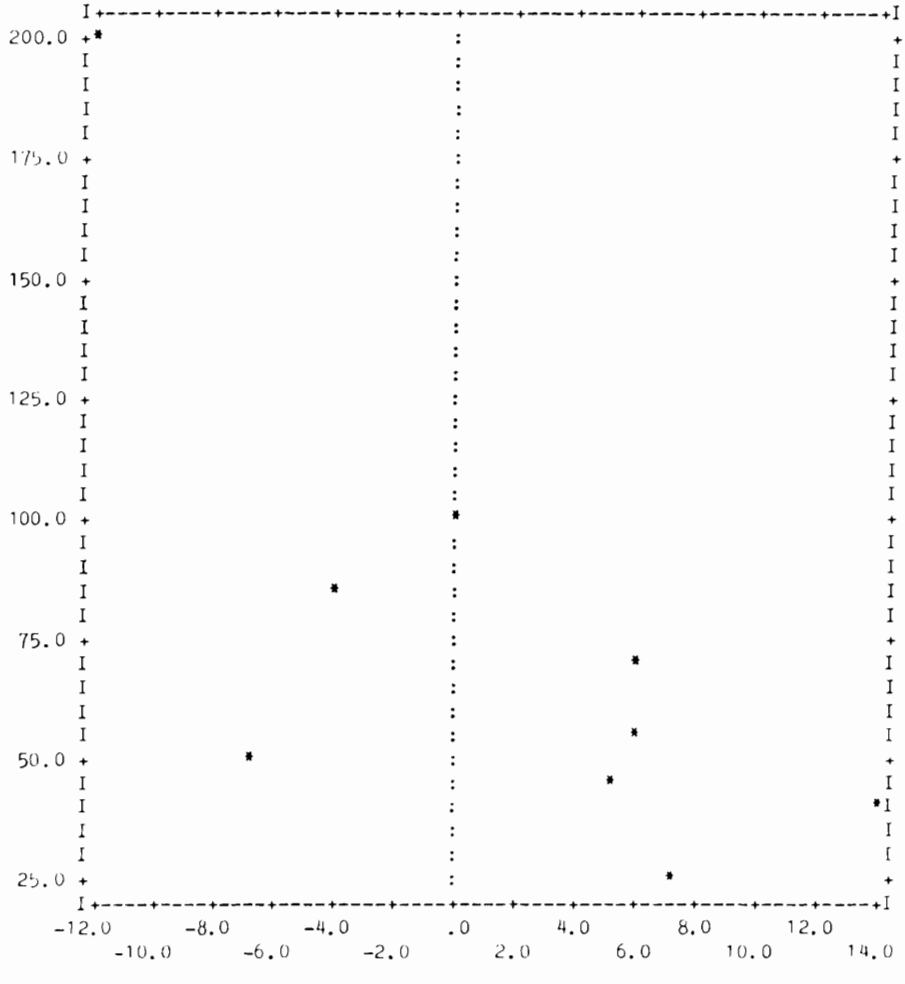

Figure 5. Plot of S-A change versus compliance.

relatively negative comment that it did not help her relax "any better than anything else." In general, those who responded most enthusiastically were more likely to be compliant.

In summary, then, the factor of generally poor compliance coupled with the demonstration of a strong and significant relationship between compliance and lowering of state-anxiety ($p = .012$) and internal-external scores ($p = .017$) provides the most likely explanation for the study's failure to show differences between groups. These clear-cut relationships prevailed in spite of the obscuring effects of intervening variables and in spite of the small sample size. The positive response of subjects to the tape itself (if not to its use), together with its demonstrated association with benefits to the patient, make further research mandatory.

Limitations

The major limitation of the study involved its recruitment procedure. Subjects were asked to take certain tests and to allow access to their records. In addition, they were told that the researcher might offer "suggestions" for their relaxation. No commitment was sought in the consent form to carry out such suggestions. This purposeful vagueness was practiced in order to minimize differences between groups due to recruitment procedures or to awareness of being in the

experimental or the control group. In retrospect, the researcher now feels that a true test of the value of a tape that employs suggestion can be made only with subjects who are enthusiastic about using it, or who are at least desirous of testing its possibilities. The intent of a uniform recruitment procedure is to rule out extraneous differences between groups. In this case, however, desire to use the tape is so bound up with the independent variable and with the very nature of autosuggestion that it can hardly be considered an extraneous variable. Stroebel and Glueck (1978) encountered the same problem in their study of passive meditation, and circumvented the issue by comparing three different treatments in lieu of treatment and control.

The duration and frequency of use of the tape may have been inadequate. Several practitioners, including the original teacher of transcendental meditation (in Stroebel & Glueck, 1978), propose a twice-daily protocol as minimal (Blacker, 1980; Simonton et al., 1978). It should be noted, again, that the subject who received the greatest apparent benefit from the tape used it at least twice a day. Because the majority of subjects in the present study were essentially well women, and because they had not agreed in advance to use the tape when they consented to participate in the study, it was felt that once a day was all that could be asked, even

though more frequent use was encouraged. In practice, few subjects met the minimum requirement. The course of fetal growth as discussed earlier is another reason for earlier and more prolonged use of the intervention. Benson (1984) observes that in his clinical experience, it may take subjects anywhere from 1 to 2 weeks to a year to show positive results (although he states that most people can expect improvement to occur in approximately 4 to 6 weeks) (p. 121). Thus the time span of 4 weeks may have been too short for some subjects to show benefit from the intervention.

It is possible that some subjects may have needed more time to adjust to using the tape. Data based on Holmes and Rahe's Social Adjustment Rating Scale show that change, when regarded as positive and desirable, is associated with stress and increased disease proneness (Calhoun, 1977, p. 155).

Implications for Nursing

The heightened anxiety and external locus of control observed in over 30% of all subjects at 4 weeks demands consideration from a profession concerned with promoting patient education and self-care. An effective means of altering these responses needs to be discovered. The present tape shows promise in this area and recommending its use is within the scope of nursing practice.

Taking a broader perspective, if advertisements

that appeared almost weekly in the researcher's mail can be used as a gauge, relaxation/visualization tapes are becoming a lucrative industry. These tapes command between $9.00 and $15.00 apiece and their producers often make extravagant claims as to their effectiveness in promoting a variety of desirable goals and human qualities (e.g., achievement, self-esteem, improved memory, the ability to attract love, and relief from a number of disorders). Where such promises involve health goals (e.g., relief from arthritis or remission of cancer), responsible health professionals cannot recommend or discourage their use without testing their claims. If effective, they represent a significant boon to patients in need; if ineffective, they are an expensive and cruel hoax. All of the advertisements cited testimonials, but none reported any controlled studies to substantiate their claims. Nurses should take the lead in such research in their specialty areas. The nursing profession, which claims to have a more holistic orientation, would ideally be more receptive to such research than would other professions. The work of Krieger on the use of therapeutic touch (1981) and Dossey's application of natural-systems theory to cardiovascular nursing (1983) suggest that this is the case.

The present study indicates that further research

on the effectiveness of relaxation/guided-imagery tapes is certainly warranted. Before undertaking such research, nurses could begin by testing applicable tapes on themselves. The nurse who has personally benefitted from a tape can be more congruent in recommending the modality to others. Conversely, nurses who recommend tapes can undermine effectiveness if they believe the qualities the tape claims to facilitate (e.g., a tense nurse can hardly be congruent in recommending a relaxation tape or a fat nurse in recommending a weight-loss tape).

Recommendations for Further Research

Future studies of the benefits of tapes that employ imagery and suggestion should select subjects on the basis of their interest in using such a tape. Since measuring tools are seldom as successful in distinguishing "good" from "better" as in distinguishing "bad" from "good," and since motivation to use the tape as directed is higher when it promises to relieve a perceived problem, it is suggested that potential subjects also possess some measurable need or problem.

The importance of the "faith factor" is another area ripe for further exploration. Subjects' "belief" in the tape could be manipulated by having it presented to one group by an unenthusiastic "outsider" (i.e.,

someone not involved in their care) and to the other group by an enthusiastic caregiver.

In further testing of the present tape, it is suggested that some effort be made to identify and control for extraneous variables that might affect anxiety and locus of control. For example, subjects could be recruited from prenatal classes. A profile of each subject would also help to identify the type of person most likely to benefit from this sort of intervention.

In order to ensure a measurable need or problem, the study could, for example, be limited to subjects with pregnancy-induced hypertension (indeed, the qualities fostered by the tape would be especially pertinent to patients with this disorder). Unfortunately, such a study would require either access to a large high-risk population on the one hand or a generous expanse of time on the other.

Use of the tape might be increased to twice a day and the test period extended to 6 weeks. Or duration and frequency of use might be manipulated in order to determine optimal values for these parameters.

Summary

This study of the effects of a relaxation/guided-imagery tape on the course and outcome of pregnancy in 22 nulliparas, although failing to demonstrate significant differences between groups, did show a strong

and highly significant relationship in the experimental group between compliance with use of the tape on the one hand and reduction in state anxiety and internalization of locus of control on the other. This relationship, along with the prevalence of poor compliance in the study, implies that the most likely reason for the study's failure to find significant intergroup differences was noncompliance. The magnitude of the relationship makes further research appear highly promising where compliance can be assured.

APPENDIX A

TEXT OF THE INTERVENTION

As you begin now to relax on your left side, let your eyes close, knowing that you may gently shift your position whenever you need to. You may notice the warmth of your left cheek and ear where they touch the pillow. And as you breathe in, tense your head and neck. As you breathe out, relax and enjoy the support of the pillow. And as you breathe in, notice the pressure and support of the pillow against your left shoulder and tense your shoulders. As you breathe out, let go of the tension. And as you breathe in, tense your right hand and arm. As you breathe out, let the tension flow out with the breath. And as you breathe in, tense your left hand and arm. As you breathe out, let the tension flow out with the breath. And as you breathe in, tense your chest and upper back. As you breathe out, release the tension. And as you breathe in, tense your abdomen, your lower back, and your bottom. As you breathe out, release the tension. And as you breathe in, feel the warmth along the inner side of your right leg where it touches the pillow. And tense your right leg and foot. As you breathe out, release the tension. And as you breathe in, feel the warmth along both sides of your left leg. And tense your left leg and foot. As you breathe out, release the tension and relax more and more. As you continue to breathe, slowly and easily, scan your body for areas of tension that may remain.

As you breathe in, tense those areas. And as you breathe out, relax them and let go of all tension.

And you may find that it can be very relaxing to think about growth and changes. A seed, for instance, grows and changes. Underground in the dark it puts out roots slowly, so that the earth, rich in water and minerals, can provide all that the seed requires. So it begins to grow, drawing strength and nourishment from the earth through the roots, until finally a green sprout appears and a leaf opens into the sunlight. But we don't have to be talking about plants.

You know about changes and growth. Once you crawled. Then you pulled yourself up and began to walk. You needed help from grown-ups. Now, as a grown woman, you help yourself and the people who depend on you. And you may let your unconscious mind recall other changes that brought growth. Some of them happened before you were ready. Others you looked forward to and welcomed when they came. Sometimes you hesitated, felt you weren't ready yet, and wanted to hold back. But changes came anyway and you found the strength was there to cope with them. Take time, now, to remember some of these changes and how you coped with them. Enjoy the good feelings that came with meeting these challenges.

And remember how good it felt to open up to these

changes and feel your strength flow, as the earth lets its strength flow into the seed until a green plant opens into the sunlight. The earth simply relaxes and lets the food and water and air that flow in the earth soak into the roots of the plant. Take some time to consider the earth, bringing food and water and air to the plant with plenty left over.

And you may be aware of the quiet beating of your heart. Each beat lets the blood flow, carrying food and water and air to nourish the cells of your body. And not only that, the blood also flows to your uterus through special passages that open out beneath the placenta into a bright warm river. The placenta sends roots down into this river to soak up food and water and air from your blood and to carry them through the cord to the growing baby. Then the river flows on through other passages in your uterus and out through the rest of your body, where the food, water, and air are replenished. And as we are speaking, the river flows on and on with every heartbeat through the roots of the placenta, which soak up food and water and air, sending them through the cord to the growing baby. And you may take some time to picture and enjoy this steady flow, and feel very comforted to think how simple it is to share food and water and air like the earth, with plenty left over.

And as you consider the passages in the wall of the uterus, carrying blood to the placenta, allow these passages to become even more open and clear, carrying even more food and water and air. Open and clear until the flow is exactly right to meet your needs and those of your baby. As you look at these passages, feeling more and more relaxed, you can allow time to open very easily.

And you may be pleased and comforted as you think how it happens, when you run, that your body makes your heart beat faster and your breath come faster. You don't know exactly how fast your heart beat and your breathing need to be. But your body knows. And before you relax even more deeply, you may want to ask your body to find a way to meet your needs and those of your baby with an open, clear, and easy flow of blood to all parts of your body and to your baby. Exactly what is needed so that the tiny blood vessels throughout your body can safely relax, knowing that you and your baby have exactly enough to grow stronger each day, able to do what needs to be done. And so that, later on, when you return to your daily concerns, relaxed and refreshed, you will notice insights emerging that will surprise you and strengthen you. Take some time now to communicate with your body.

As you speak with your body, continue to watch

the flow of blood through the clear and open passages of the uterus, through the roots of the placenta, which draws out food and water and air for the baby, and back through the uterus and out to the rest of your body. And see how the passages to the uterus and the tiny blood vessels throughout your body can relax to allow exactly the right amount of flow to meet your needs and those of your baby. And as you watch your body tune itself in harmony with your needs and those of your baby, you can assist with this tuning by repeating in your mind, smoothly and easily, the words "relaxed, open, flowing, relaxed, open, flowing," over and over, "relaxed, open, flowing..."

And now, you can extend your awareness to the rest of your body, stretch your arms and legs, and feel refreshed, alert, and powerful, able to do what needs to be done. And when you are ready, you will find that you can open your eyes and continue to enjoy the good feelings.

APPENDIX B

INSTRUCTIONS FOR USING THE TAPE

When listening to the tape, relax on your left side with your head, your right arm, and your right leg supported by pillows (at least two, you may use more if you like).

Try to arrange your schedule so that you will not be interrupted while using the tape (for example, you might have someone else answer the telephone--or disconnect it during this time).

Allow at least one half hour for the exercise. The taped visualization will stop before the half hour is over in order to give you time to continue to visualize (picture in your mind as clearly as possible) the changes that are described on the tape. Toward the end of the half hour, as the tape continues to play, you will hear directions for returning to alertness, but you may continue to visualize longer if you choose.

Your attitude should be relaxed and peaceful throughout. Visualize your body functioning in a health way, but do not attempt to force it to do so: The relaxed picture is enough--and the more relaxed, the more effective. If you feel twitches and other nervous movements in your arms, legs, face, etc., you are probably trying too hard. The essence of this exercise is to make a vivid picture in your mind and to enjoy it.

The notebook you have been given is for your own use in order to record your experiences with the tape, or any problems or questions related to the exercise. It is also for writing down some of the insights that will come to you after you have been using the tape for a while. You may set these down in pictures as well as words.

You are, of course, encouraged to share any of this record with the researcher--and the researcher will be asking if you are having any problems or questions concerning the tape--but the notebook itself is given for your private use.

Use the tape once a day. Please keep a record of each time you listen by putting an "X" on the practice record below. Count today as day one. You may not be able to avoid missing an exercise occasionally, but to get the best results, you should use the tape as regularly as possible.

Day:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

17	18	19	20	21	22	23	24	25	26	27	28	29	30

APPENDIX C

CONSENT FORM

Study Title: Stress Management and Pregnancy Outcome

You are being invited to participate in a study designed to assess the effects of stress and its management on the course of pregnancy.

You will be asked to meet with the researcher, who is a registered nurse studying to be a midwife at the University of Utah, at two of your regular clinic visits. At the first visit, she will ask you to fill out two short questionnaires (about 20 minutes or less for each) that have you choose items that best describe your self-evaluation and the way you are affected by certain events in our society. She will also discuss with you your ways of coping with stress and may offer suggestions for your relaxation. At the second visit, 4 weeks later, the researcher will repeat the tests of self-evaluation and reaction to events in our society. She will not prescribe medications.

The researcher will also examine your clinic record to determine your blood pressure and urine protein at each visit. She will examine your delivery record and/or your baby's newborn record for information about your labor and delivery and about the baby's birthweight, gestational age (premature, on-time, late), and 5-minute Apgar scores (a measure of how well your baby's heart, lungs, nerves, and muscles are working 5 minutes after birth). These measurements are routinely made on all babies.

All the information needed for this study will be obtained at these visits or from your clinic and hospital or birth-center records. Consent for the researcher to use your records will expire on June 30, 1985.

You will continue to receive whatever medical treatments are appropriate for you during your pregnancy. You will not be deprived of any treatment because of your participation in this study. Your participation is voluntary and you may withdraw at any time by calling the researcher, Donna Gordon, at 583-9417. Withdrawal will not affect your current care.

There are no known ill effects from participating in this study, and you may experience a greater sense of control over your body's functioning. If you have any further questions about the study, or if you notice what seems to be any ill effects, please contact the researcher, Donna Gordon, at 583-9417.

In the event that you sustain physical injury resulting from the research project in which you are participating, the University of Utah will provide you, without charge, emergency and temporary medical treatment not otherwise covered by insurance. If you believe that you have suffered a physical injury as a result of participation in this research, please contact the Office of Research Administration, telephone number 581-6903.

You and the other participants in this study will be assigned a code number, and all information will be identified in the study by that number rather than by your name. Only the researcher will know whom each number represents, and she will keep this information confidential.

I, _____ agree to participate in the study entitled Stress Management and Pregnancy Outcome. By signing this form I am saying that I have had the opportunity to ask questions about the procedures, risks, and other items involved in this study. I agree to allow the researcher to make the measurements described above, and to copy from my medical records and my baby's the information described above. I have read this entire paper and agree to participate in the study.

_____ _____
Signature of Patient Date

_____ _____
Signature of Care-Provider Date

_____ _____
Signature of Witness Date

_____ _____
Signature of Researcher Date

APPENDIX D

DATA COLLECTION SHEET

	Date	BP_d	Pro.	STAI	IES	Freq.
Baseline	_____	_____	_____	_____	_____	_____
Week 1	_____	_____	_____			_____
Week 2	_____	_____	_____			_____
Week 3	_____	_____	_____			_____
Week 4	_____	_____	_____	_____	_____	_____
Post-session	_____	_____	_____			_____
	_____	_____	_____			_____
	_____	_____	_____			_____
	Max.	Max.				
	_____	_____	_____			_____
	_____	_____	_____			_____
	_____	_____	_____			_____

Name: _____

Code#: _____ Age: ___

Caregiver: _____

Pre-Pg. Wt. _____

1st-Tri. BPd Range:

_____/_____

EDC: _____

Del. Date: _____

Del. Type: _____

Labor/Del. Complications: _____

_____

Anesth./Analgesia & Time: _____

Wks.		BW		SGA?
_____	+	_____	-	____

Live	Still	5-min. Apgar
____	_____	_____

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